The OIL WEEKLY

OIL and GAS ENGINEERING

INTERNATIONAL AUTHORITY FOR THE PRODUCING AND PIPE LINE INDUSTRY

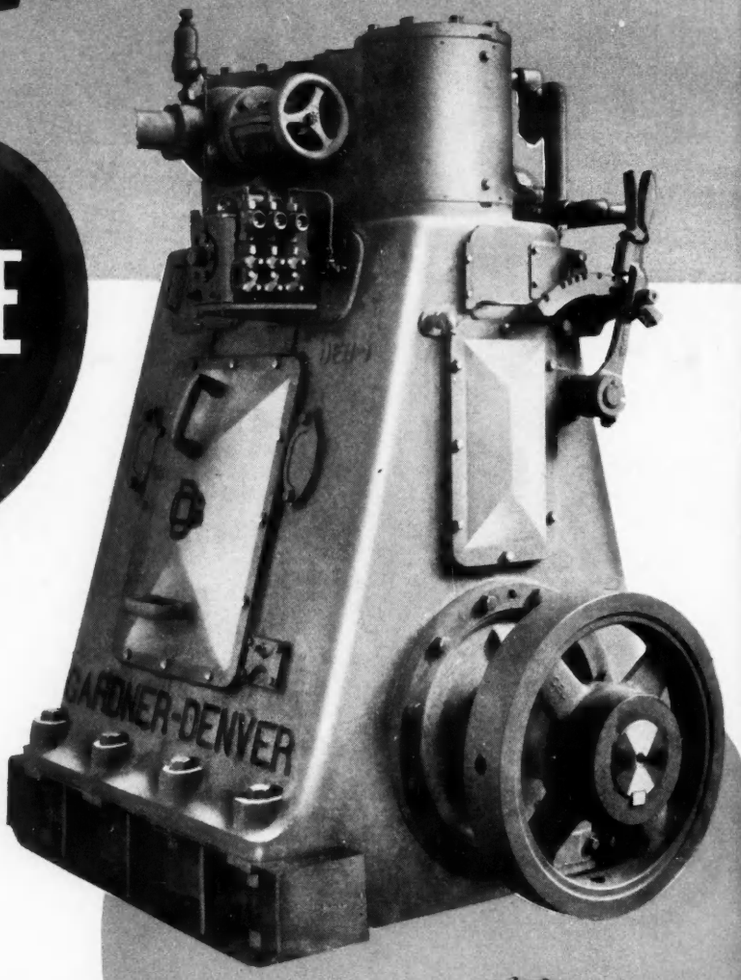
THE WEEK'S NEWS INTERPRETED

Cutting Teeth on
Hughes "Self-Cleaning" Cones

HUGHES TOOL COMPANY—HOUSTON, TEXAS—U. S. A.

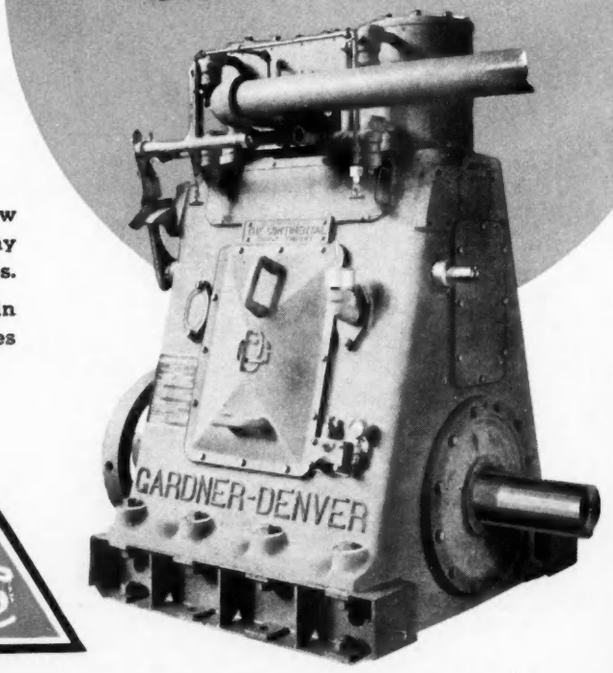
CONTINENTAL Announces

A VERTICAL ENGINE FOR GREATER Economy



Especially Designed for..
Rotary Drilling and Power Pump Drives

- MADE IN TWO SIZES—8 x 8 AND 9½ x 8—FOR VARIOUS STEAM PRESSURES
- PISTON TYPE STEAM VALVES WITH ADJUSTABLE CUT-OFF
- AUTOMATIC DUMP VALVES
- ROLLER MAIN BEARINGS
- METALLIC PACKING TO PREVENT CRANKCASE DILUTION



An Outstanding Addition to the Well-Known Gardner-Denver Engine Line

Up-to-the-minute in design, rugged in strength, carrying many new mechanical refinements, and built by Gardner-Denver—here is a worthy companion to the famed line of horizontal drilling engines and slush pumps.

Compact in design and dependable in operation, the Vertical Twin Cylinder Engine escapes the hazards of costly breakdowns and insures economy PLUS in service.

●

THE CONTINENTAL SUPPLY COMPANY
General Offices: DALLAS, TEXAS
Export Office: CONTINENTAL EMSCO CO., Inc.
30 Rockefeller Plaza New York City, N. Y.
Representatives:
LONDON MARACAIBO PLOESTI BUENOS AIRES

"SERVING THE OIL AND GAS INDUSTRIES"

CONTINENTAL

E. Eng.

THE OIL WEEKLY

ENGINEERING « NEWS » STATISTICS

EDITORIAL STAFF

WARREN L. BAKER
Editor
J. KENT RIDLEY
Managing Editor

ASSOCIATE EDITORS

L. J. LOGAN — BRAD MILLS
WM. V. GROSS

DISTRICT EDITORS

B. F. LINZ.....Washington
GRADY TRIPLETT, FRANK TAYLOR, JACK CASBURN.....Tulsa
H. H. KING.....Fort Worth
W. E. GREEN.....Los Angeles
EARL S. POST.....San Antonio
R. W. BYRAM.....Austin
CHAS. LEYENDECKER.....Houston

PUBLISHED BY
THE GULF PUBLISHING COMPANY
HOUSTON, TEXAS

R. L. DUDLEY, *President*
A. L. BURNS, *General Manager*
S. W. ROBINSON, *Editorial Director*

Staff correspondents at all important points.

Member Audit Bureau of Circulation
Member Associated Business Papers, Inc.

BRANCH OFFICES

NEW YORK.....250 Park Ave.
PITTSBURGH....Standard Life Bldg.
CHICAGO.....332 S. Michigan Ave.
LOS ANGELES.....Haas Bldg.
TULSA.....Hunt Bldg.
FORT WORTH.W. T. Waggoner Bldg.
SAN ANTONIO.....112 Jefferson St.
WASHINGTON.....Albee Bldg.

ADVERTISING STAFF

DICK SWINSKY.....New York
W. W. PIGUE.....Pittsburgh
WM. ATCHESON.....Pittsburgh
T. W. NELSON.....Chicago
J. F. CARTER, JR.....Tulsa
W. E. GREEN.....Los Angeles
CHAS. WYATT.....Houston

CIRCULATION DEPARTMENT

J. T. WAGONER.....Manager

SPECIALIZED OIL JOURNALS

Published by

THE GULF PUBLISHING COMPANY

The Oil Man's Calendar

JUNE	
14-19	**Second World Congress of Petroleum Paris, France.**
17	**National Stripper Well Association, Tulsa, Oklahoma.**
20-26	**Golden Celebration of Oil and Gas, Findlay, Ohio.**
25-27	**National Oil Scouts Association, Dallas, Texas.**
JULY	
	Seventeenth International Geological Congress, Moscow, U.S.S.R.
12-13	**Interstate Oil Compact Commission, Santa Fe, New Mexico.**
AUG.	
10-15	**Third Michigan Oil & Gas Assn., Mt. Pleasant.**
SEPT.	
15-17	**National Petroleum Association, Hotel Traymore, Atlantic City, New Jersey.**
SEPT. 27 OCT. 1	**American Gas Association, Cleveland, Ohio.**
OCT.	
11-16	**Oil-World Exposition, Houston, Texas.**
14-16	**American Association of Petroleum Geologists, Mid-Year Meeting Pittsburgh, Pennsylvania.**
14-16	**Independent Petroleum Association of America, Houston, Texas.**
29-30	**Mid-Continent Oil and Gas Association, Texas Division, Dallas, Texas.**
NOV.	
9-12	**American Petroleum Institute, (Annual), Chicago, Illinois.**

Contents « June 14, 1937

Volume 86, Number 1

THIS WEEK 35
EDITORIAL 45
GENERAL NEWS:
Dismiss Charges Against Two Companies in Conspiracy Case.... 40
Watch Lawsuit—May Affect All Foreign Firms Active in Texas 41
Reelect Officers of Oil-World Exposition and Increase Directors 41
Outlook Improved by Better Control..... 42
By L. J. LOGAN
Men in the Industry's News.....131
Squeaks From the Bull Wheel.....184
ENGINEERING SYMPOSIUM—Drilling and Exploration Features:
Drilling Practices—Rotating Speeds and Weight on Bit Receive Attention 50
By BRAD MILLS
10,000-Foot Drilling Becoming Common, and of Industrial Importance 54
By WARREN L. BAKER
Coring Increased and Improved Past Year..... 64
By EARL S. POST
Exploration by the Reflection Seismograph in Gulf Coast..... 70
By E. E. ROSAIRE
Methods of Controlling Pressures..... 85
By BRAD MILLS
Abuses in Handling Tubular Goods..... 92
By L. R. SMITH
Micromagnetic Predictions Proven by Drill.....110
By W. P. JENNY
Heaving Shale Drilling Featured by Improved Mud and Mechanic Practices 115
By BRAD MILLS
Drilling Mud Work Now More Systematic and Highly Developed 121
Specialization of Equipment Distinct Trend the Past Year.....125
By FRANK B. TAYLOR
Geophysics Vs. Geology—An Educational Problem.....127
By H. LANDSBERG
MARKETS AND STATISTICS.....141
WORLD DEVELOPMENTS.....137
FIELD DEVELOPMENTS 147
NEW PRODUCTS AND MANUFACTURERS NEWS.....179

Published every Monday. Single Copies 15 cents (Special Issues 50c). Subscription price: domestic and foreign, $2.00 a year; 2 years $3.00. Entered as second-class mail matter December 23, 1916, at the post office at Houston, Texas, under act of March 3, 1879. Subscription restricted to those engaged in the producing and pipe line branches of the oil industry or the manufacturing and distribution of oil field supplies. Advertising rates on application.

Copyrighted 1937 by The Gulf Publishing Company.

Distributed throughout the Mid Continent and Gulf Coast by

Lucey BOILERS

(see opposite page)

BRIDGEPORT

For prompt delivery on Lucey Boilers, from convenient stocks or direct from the factory, telephone the handiest Bridgeport Representative—station to station.

THE BRIDGEPORT MACHINE COMPANY

HOUSTON . DALLAS . SAN ANTONIO . CORPUS CHRISTI . ODESSA
SHREVEPORT . TULSA . OKLAHOMA CITY . WICHITA . and Branch Stores

LINK-BELT *Vibrating* SCREENS

for Reconditioning Rotary Mud

● Clean mud of uniform consistency and weight can be maintained automatically with the Link-Belt Vibrating Screen. This efficient unit rejects shale and clay cuttings from the mud as it flows over the screen surface on its way to the slush pit, and eliminates a large proportion of fine sand and shale as well. The action of the screen also thoroughly de-gasses and reconditions the mud for re-use without loss of good mud or a reduction in viscosity. Send for Folder 1672.

6013

LINK-BELT COMPANY

Philadelphia Los Angeles NewYork Dallas
Houston Oklahoma City (W. H. Abele, Box 305, Rt. 4)

GET ACCURATE RESULTS—*Quickly, Easily with this improved CURTIN Centrifuge*

You can maintain the required speed for the period of the test with much less effort. They are heavy duty type, rigidly constructed, and extremely simple in design. The cranks and heads for 15 c.c. and 100 c.c. machines are interchangeable.

Get details from this bulletin, available to you for the asking →

No. 3480 W. H. CURTIN & COMPANY, INC.
HOUSTON, TEXAS

LOOKING AHEAD

WITH THE EDITOR

Production Engineering Makes Progress . . .

New Producing Problems Arise . . .

To Publish Special Issue on Subject . . .

PRODUCTION engineering is making remarkable progress. Today the industry knows much more about bottom-hole pressures and other reservoir conditions and their influences on production. As a result, a larger volume of the original reservoir content is being produced and at cheaper costs than a few years ago. Likewise, there has been much improvement in equipment and its operations.

At the same time new problems have arisen, and studies along petroleum production lines continue with renewed interest. Ever increasing depths, encounterance of high pressures and large volumes of gas, are but a few of the many new problems that are giving impetus to such research. Through improvements in completion and producing practices much progress has been made in overcoming these and other problems.

New production engineering progress will be the subject of

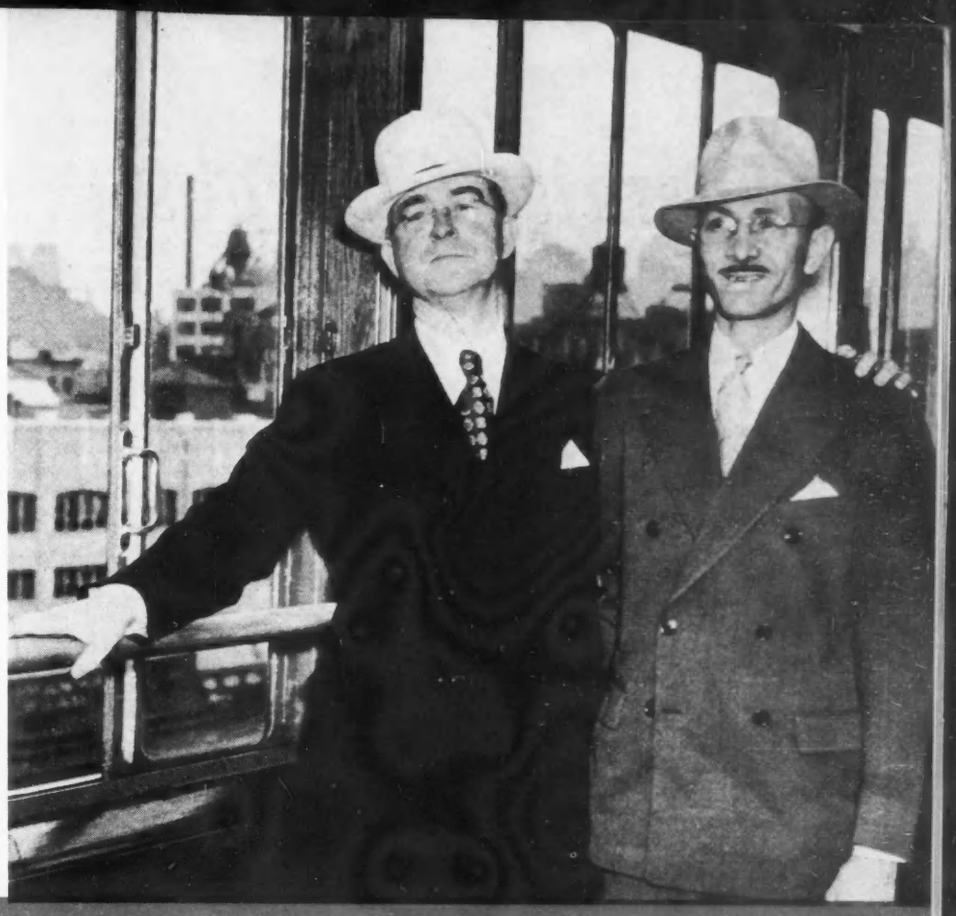
THE OIL WEEKLY'S
Production Engineering Number
JUNE 21, 1937

This issue will discuss such pertinent subjects as the following: Advancements in gas-lift practices; Proper care and repair of oil well pumps; Lifting costs; Modern completion methods; Progress in water flooding Mid-Continent fields; Efficient utilization of gas; Analysis of depths from which present production is obtained; New trends in production methods and technique; A survey of wells to go on the pump; and other topics.

THIS WEEK

» COLONEL ERNEST O. THOMPSON of the Texas Railroad Commission and his technical advisor, R. W. Byram of Austin, associate editor of The OIL WEEKLY, aboard the steamship Normandie as she cast off mooring lines in New York harbor to take delegates from the United States to the Second World Petroleum Congress in Paris, June 14-19. Thompson will speak on production control and will issue an invitation to those at the congress to attend the Oil-World Exposition in Houston this fall.

—World Wide Photo



THE current proration program and records of results in recent weeks show the industry is in a satisfactory position. A virtual balance between production and consumption looms for June. While May production still caused some additions to storage, the amount of increase was smaller than in April, March or February. Moreover, gasoline stocks were reduced. Consequently, there has been revival of talk recently of an advance in crude oil prices, which apparently has been held in abeyance because of increasing storage. **Page 42.**

IN several rulings handed down last week in the government's "oil conspiracy" case, charges were dismissed against two companies, thereby reducing the number of corporated concerns to 24. The charges against the two companies were dropped on behalf of pleas that they had been dissolved during the federal grand jury investigations. **Page 40.**

A TWO-YEAR extension of the Connally contraband oil act was agreed upon last week by conferees of the Senate and House, assuring uninterrupted operation of the measure until June 16, 1939. The act would have expired the middle of this month had it not met with approval. **Page 40.**

THE past year was filled with achievements that reflected rapid advancements in drilling engineering, both in technique and equipment. With 1937 methods and 1927 equipment, it is possible to drill to a much greater depth than recorded in 1927. With 1937 methods and modern machinery, it is possible to reach depths unthought of 10 years ago, and also to overcome many difficult situations believed uncontrollable at that time. Because of the great advancement in drilling equipment and engineering, this issue is devoted particularly to drilling and exploration progress. The section begins on **Page 49.**

CURRENT SITUATION

(Latest Available Weekly Data)

Outlook. — Favorable. Markets promise to continue strong.

Crude Market. — Pennsylvania prices raised.

Refined Oil Markets.—Tank wagon prices reduced by Standard of Indiana.

Crude Production.—Down second consecutive week.

Crude Runs to Stills—Down 50,000 barrels daily.

Crude Stocks.—Up 744,000 barrels to 305,745,000.

Gasoline Stocks.—Down 1,264,000 barrels.

Gas and Fuel Oil Stocks.—Up 1,263,000 barrels.

Drilling.—Completions last week 480.

See* MARKET SECTION *for Details

THE year 1937 will go down in oil history as marking the time when drilling of 10,000-foot and deeper tests became common, rather than uncommon. Since the first 10,000-foot test was drilled six years ago, 47 tests have exceeded this footage—and of this number 22 have been active during the first five months of 1937. This is of much importance. It proves the ability of equipment and methods to drill this deep, and brings within reach of the bit many additional barrels of crude oil. **Page 54.**

TUBULAR goods are one of the most seriously abused pieces of equipment in the oil industry. Many thousands of dollars are lost annually through carelessness and improper handling of drill pipe, casing and tubing. Each concern can well afford to train crews to properly load, unload, and to handle these products. Detailed suggestions for this work are given in another of our "Equipment Care Series" articles. **Page 92.**

THE trend the past year has been toward rapid rotating speeds and reduced weight on the bit. This is in contrast to the practice a few years ago, when the driller increased the weight in order to make better footage. The proper speed, however, must be governed by several factors. Equipment and the formations being penetrated must be considered. **Page 50.**

Dismiss Charges

TWO COMPANIES RELEASED IN "OIL CONSPIRACY" CASE

Madison, Wis.—Charges were dismissed against two oil companies in the government's "oil conspiracy" case by Federal Judge Patrick T. Stone last week. The dismissal rulings were made on pleas presented by defense attorneys that both companies had dissolved during the course of federal grand jury investigations. The charges were dismissed against Tide Water Oil Company, now Tide Water Associated Oil Company, and against Marathon Oil Company, now known as Ohio Oil Company.

The action, one of several orders issued by Judge Stone during the week, reduces the number of corporate defendants who must stand trial here September 27 from 26 to 24. The companies, along with 71 of their officers and three trade journals, are charged with conspiracy to artificially set retail gasoline prices and to "squeeze out" independent jobbers through the operation of a buying program in the East Texas and other Mid-Continent fields.

At hearings held before Judge Stone earlier in the year, it was pointed out that dissolution of Tide Water Oil Company and Marathon Oil Company followed plans in contemplation months before the start of the grand jury investigations here, and had no bearing upon the investigations.

Officials Still Held

Pleas similar to those entered for the Tide Water and Marathon companies were entered on behalf of the following officers of the companies, but were refused by Judge Stone: Edward L. Shea, New York, president; Noel Robinson, New York, vice president; J. W. Warner, Tulsa; and R. O. Audrain, Tulsa, all of Tide Water; and L. B. McCammon, Tulsa, general salesmanager for the former Marathon Oil Company.

Other orders dealt with bills of particulars. Some of the points requested by defense attorneys were granted, some had previously been given by government attorneys when the modified demands were presented to the court two months ago, while still others were refused. The court denied all demands for the dates and places of the alleged conspiratory meetings and for information on what took place in them. Government attorneys were given 40 days in which to furnish information on the demands that were granted, but Judge Stone specified that furnishing this information did not preclude the government from introducing additional evidence on the points covered.

The motion for a bill of particulars filed in behalf of Warren C. Platt, Cleveland Ohio, and two of his trade journals, the National Petroleum News and Platt's Oilogram, was denied, Judge Stone holding that the indictments, as they applied to these defendants, to be "clear and simple." "The information . . . is within the knowledge of the defendants, and is found in the records and documents of the defendants which were produced upon the subpoena of the government . . . and which have been returned to the defendants," the court said.

In denying other requests, Judge Stone asserted that much of the information requested was "within the knowledge of the defendants," or was contained in subpoenaed papers which had already been returned to them for use in preparing their defense.

Judge Stone also overruled a special demurrer filed on behalf of P. C. Scullin, Houston, Texas, vice president and general manager of Indian Refining Company. The demurrer charged that the indictment implicating Scullin did not state sufficient facts on which he could be held. Judge Stone ruled that the indictment is clear and charges the defendant with commission of acts which by law are made criminal and punishable. Exceptions to the order were filed by defense counsel.

MUST FACE TRIAL

Judge says Carlisle must go before Madison court

Galveston.—O. H. Carlisle of Houston, executive of Gulf Oil Corporation, must go to Madison, Wisconsin, to stand trial on charges of violating the anti-trust laws along with 51 other officials indicted on charges of conspiring to raise and maintain spot market prices in the East Texas oil field and other Mid-Continent fields.

That was the ruling of District Federal Judge T. M. Kennerly in Galveston June 8. It constituted a reversal of the prior ruling by United States Commissioner W. F. Carothers in Houston. The commissioner had refused to order Carlisle's commitment or removal.

It is understood Carlisle's attorneys plan to appeal to the circuit federal court.

PASS HOT OIL ACT

Congress agrees upon two-year extension

Washington.—A two-year extension of the Connally contraband oil act was agreed upon June 9 by conferees of the Senate and House, assuring uninterrupted operation of the measure until June 16, 1939.

Two meetings of the conferees were necessary to reach an agreement, the Senate members seeking a four-year extension, to which the House would not consent.

A report setting forth the senate's acceptance of the house provision instead of the permanent continuance provided for in the bill as passed by the senate and the four-year extension sought as a compromise, was signed by Senators Connally of Texas and Lonegran of Connecticut, and Representatives Cole of Maryland, Kelly of Illinois, Mapes of Michigan and Wolverton of New Jersey. The house approved the report June 9, the senate the following day.

The bill extending the hot oil act was introduced in the senate by Senator Connally on January 14 and in the house by Representative Dies on March 5. Senate hearings were held in February and the bill was passed March 29. The house held hearings in April and passed the bill this month.

STUDY POTENTIALS

Changes in methods and totals before Oklahoma

Oklahoma City. — Readjustment of potential totals and changes in methods of determining well capacities will come before the Oklahoma corporation commission June 22 and 23, when hearings are held to set up basic figures for setting allowables for the next six months. The Wilcox sand zone of the Oklahoma City pool, the 34 Class B pools and the 14 pools under Class C will have consideration.

Lease basis operation of Wilcox sand wells at Oklahoma City will draw most attention. By this method the several wells on a lease may have total output pooled, by which one or more wells of high capacity make up any deficit of wells of below maximum capacity. The lease basis allows a 400-barrel well and a 200 barrel well to produce the minimum for each.

Previously potentials for the Oklahoma City Wilcox zone were set April 1 and October 1. At the last determination the potentials were extended to July 1. This placed the field in harmony with other fields as to time for determination of potentials.

Three Not Restricted

One object of the hearing for Class B pools will be consideration of removal of any of these fields from proration restrictions. Most of the 34 fields are in the Greater Seminole area and only three are not under restriction. These are Keokuk Falls, where 91 wells have a potential of 67,462 barrels daily; Lucien, with 95 wells and 98,178 barrels potential; Olympic, 218 wells with 51,641 barrels potential. The remaining 31 pools of B classification are allowed 100 percent of output, although they are still under supervision of proration orders. The hearing June 22 will give consideration to putting some of these fields officially in the unprorated classification.

Pools under Class C rating are due for consideration as follows: tubing of wells not already tubed, taking of potential tests through tubing, taking of monthly bottom hole pressure tests on key wells and establishment or alteration of minimum allowables for the pools as well as possible

reclassification of any pools of this class.

The new Moore pool of Cleveland County may bring out the serious controversy of the hearing. Its 24 producing wells now have the highest allowables in the state, as the field is under an order for 13,000 barrels daily output. Other pools in this class are North Bethel, Billings, Wilcox zone, South Britton, Crescent, Edmond, Fitts Hunton lime, Fitts Upper Simpson, Fitts Wilcox, Jesse, Langston, North Lucien, Sasakwa East Wilcox zone and North Wellston.

At the hearing by which allowables were fixed for June producers in other fields protested against the output granted the Moore pool as well as methods of production. The charge of excessive gas-oil ratios and rapid drop in bottom hole pressure was offered as part of the plea for reduced allowables at Moore. Seven of the wells at Moore are operating under potentials which were set arbitrarily by the corporation commission because it was dangerous to open the wells for sufficient time to determine actual output. Wells at Moore produce free sand when opened and connections are rapidly cut out.

Watch Lawsuit

MAY AFFECT ALL FOREIGN OIL FIRMS ACTIVE IN TEXAS

Austin.—A lawsuit which may affect every oil company in Texas operating under a foreign charter, as well as every other such corporation, regardless of the commodity handled, is pending in 98th District Court at Austin.

The suit will test out a new method, or formula, evolved by Secretary of State Edward Clark, acting on the advice of Attorney General William McCraw, for determining the capital structure of such corporations.

After the new formula had been worked out, franchise taxes on the revised basis were assessed the Atlantic Pipe Line Company. That company paid under protest, and has filed suit to recover them.

The amount directly involved, $8111, is not particularly large; but is large in contract with previous franchise taxes assessed against the same company, ranging from $10 to $18 per year over the past several years.

The franchise tax law says, in effect, that in determining the amount of capital structure used in a corporation's Texas business, the gross receipts of the company accrued purely from Texas business shall be measured against the company's total gross receipts.

Atlantic's annual gross receipts range from $6,200,370 (1935) to $7,415,330 (1932); but the company claims that only $22,000 was actually intrastate business. The $22,000 represents the approximate proceeds of gathering systems wholly within Texas.

Texas now seeks to include all these receipts, excepting only the New Mexico receipts, as the Texas receipts for purposes of measuring franchise tax values.

Far-reaching effect of such a construction of interstate commerce is readily apparent. Possibly the largest company outside the oil and pipe line companies which would be effected is the sulphur company. Then, most Texas flour mills would be affected—in fact, any company which ships products out of the state.

The case is now only in the first phases of trial, but may assume unprecedented importance before the question is finally determined.

Reelect Officers

OF OIL-WORLD EXPOSITION AND INCREASE DIRECTORS

Houston.—All officers of the Oil-World Exposition, Inc., which is to hold a show in Houston next October, were reelected at the annual membership meeting of the organization on June 8. The board of directors was increased from 36 to 51 at the same time.

JOHN R. SUMAN
was reelected president of Oil-World Exposition, Inc.

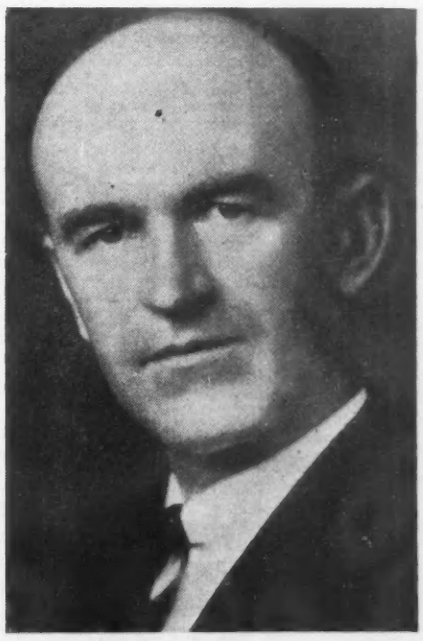
John R. Suman, vice president of Humble Oil & Refining Company, is president of the organization, which is a non-profit sharing concern. Executive vice president is Chase E. Sutton, division manager for Pure Oil Company. There are four vice presidents, as follows: J. S. Abercrombie, president of J. S. Abercrombie Company; George A. Hill, Jr., president of Houston Oil Company of Texas; W. L. Childs, vice president, Reed Roller Bit Company; and Wallace Wilson, president of Wilson Supply Company. Ray L. Dudley, president, Gulf Publishing Company, is secretary-treasurer. Ed G. Lenzner continues as general manager. All officers of Oil-World Exposition, Inc., are of Houston.

Largest Houston Show

The show in October will be the first held under the auspices of the Oil-World Exposition, Inc., but is certain to be much larger than any previous one held here. Already space has been signed by more than 400 exhibitors. All space inside the hall is taken, and it has been necessary to provide additional room. Much of the open air space outside the hall is also contracted for.

At least two conventions will be held in the city during the exposition. The American Gas Association and the Independent Petroleum Association of America have made definite plans. In addition, there will be several scientific

[*Continued on page 142*]



CHASE E. SUTTON
reelected executive vice president, Oil-World Exposition, Inc.

Outlook Improved

Virtual balance of crude production with demand is in prospect for June, under stricter allowables of leading producing states. Elimination of runs to storage therefore is promised.

By L. J. LOGAN,

COMPARATIVELY little fault can be found in the oil industry's present situation or in its prospects between now and July 1.

Furthermore, it probably may be safely assumed that the favorable situation will be maintained even further into the summer.

Outlook Promising

The outlook is promising until July 1 by reason of the strict program for control of crude oil production during June. The six leading producing states, accounting for 92 percent of the country's crude output, have in effect this month state allowables that are less than 1 percent in excess of the estimates of market demand as determined by the Bureau of Mines. Consequently, there looms for June a virtual balance between production and consumption. And the running of excess crude to storage likely will be almost or entirely eliminated at last, following four months of increasing stocks.

Hope for Better Prices

The runs to crude storage, under way consistently since late January, have increased stocks about 20,000,000 barrels, and have caused considerable anxiety. This anxiety perhaps has been instrumental in preventing, so far, a general increase in prices of crude and products.

Since the June allowables promise to restore a balance between production and demand, however, hopes for price betterment lately have been revived.

Raises Show Firmness

Those hopes have been stimulated, moreover, by the late-May increase of the East Texas crude price posting and by the early June advance of Pennsylvania grade prices. Those advances indicate that the crude prices are tending to increase generally. The hopes for increases are being expressed in California as well as in the Mid-Continent.

Meanwhile, the markets for crude at the present prices are particularly strong, giving further indication that higher price levels perhaps could be sustained successfully.

Even following the 8-cent increase in East Texas, the market in that area has continued tight, and competition of purchasers for well connections has been keen. Consequently, there has been talk of the possibility of still higher prices for East Texas.

The markets for refined products, similarly, are firm and tending to increase.

May Brings Improvement

The present satisfactory position of the petroleum industry is demonstrated not only in the current proration program but also in the records of results in recent weeks.

Statistics covering May show that results in that month were the best since January.

Crude oil production still was not held back sufficiently to conform with market requirements, but the control was the most effective since January.

With the crude output excessive, there was a further addition to storage during May; but the gain in stocks was smaller than the additions of April, March, or February.

Between May 1 and May 29 the total stocks of crude oil in the United

Excesses of Average Daily Crude Production Above Bureau of Mines Recommendations in Past Six Months

(Barrels Daily)

Note: Production figures calculated from American Petroleum Institute Reports.

MONTH	California	Kansas	Louisiana	New Mexico	Oklahoma	Texas	Other States	United States
December, 1936:								
Production	587,393	170,516	240,566	85,390	581,980	1,204,571	239,169	3,109,585
Demand	553,400	155,900	204,800	78,300	567,000	1,145,200	225,700	2,930,300
Excess	33,993	14,616	35,766	7,090	14,980	59,371	13,469	179,285
January, 1937:								
Production	589,374	169,068	244,523	92,365	587,316	1,252,056	238,688	3,173,390
Demand	559,900	165,600	216,300	79,800	573,100	1,176,000	227,700	2,998,400
Excess	29,474	3,468	28,223	12,565	14,216	76,056	10,988	174,990
February, 1937:								
Production	587,793	177,989	243,598	96,896	605,143	1,323,775	242,534	3,277,728
Demand	573,300	170,000	225,100	81,600	581,900	1,203,400	233,300	3,068,600
Excess	14,493	7,989	18,498	15,296	23,243	120,375	9,234	209,128
March, 1937:								
Production	589,439	186,731	245,115	102,229	627,763	1,392,742	251,087	3,395,106
Demand	570,900	178,000	240,000	88,200	590,700	1,256,600	234,600	3,159,000
Excess	18,539	8,731	5,115	14,029	37,063	136,142	16,487	236,106
April, 1937:								
Production	621,226	191,426	248,826	105,510	657,586	1,380,008	260,601	3,465,183
Demand	579,900	183,000	244,800	91,400	609,600	1,297,900	236,400	3,243,000
Excess	41,326	8,426	4,026	14,110	47,986	82,108	24,201	222,183
May, 1937:								
Production	653,048	196,534	246,447	112,289	653,690	1,415,466	262,231	3,539,705
Demand	583,300	187,100	249,400	99,800	622,700	1,340,800	249,800	3,332,900
Excess	69,748	9,434	*2,953	12,489	30,990	74,666	12,431	206,805

*Under-production.

Average Daily Number of

Wells Completed in the United States

(Including Oil Wells, Gas Wells, and Dry Holes)

MONTH	1933	1934	1935	1936	1937
January	30.0	39.7	47.9	52.4	66.1
February	30.6	38.1	49.6	51.6	58.6
March	26.6	40.6	48.8	60.6	70.4
April	25.5	44.0	58.5	69.2	78.1
May	25.6	50.7	63.6	71.9	80.8*
June	21.1	51.5	58.6	70.9	....
July	23.1	53.6	60.9	66.6	....
August	30.7	51.3	62.8	70.4	....
September	36.5	43.2	57.9	65.4	....
October	40.9	49.6	57.1	67.8	....
November	46.9	49.9	55.2	67.7	....
December	47.7	48.3	54.2	67.7	....

*Highest since November, 1926, when completions averaged 85.9 daily.

By Better Control

Despite substantial additions to crude stocks in past four months, inventories are smaller than year ago, while demand is up about 10 percent. Industry's position consequently is favorable.

Associate Editor

States increased approximately 2,500,000 barrels, or from 303,249,000 to 305,745,000 barrels. These figures are from the regular weekly reports of the Bureau of Mines.

In comparison with this 2,500,000 barrels addition to crude stocks in May, the additions had been approximately 6,000,000 barrels in April, 7,500,000 barrels in March, and 3,000,000 barrels in February. In January, the recent overproduction period had not yet commenced, and for the month there was a net withdrawal of about 1,500,000 barrels of crude from storage.

Thus in May there was a decided improvement in crude control, as compared with the three preceding months.

June Control Strict

Furthermore, the allowables have been tightened further to such extent for June as to indicate that there may be a complete elimination of additions to storage.

The June allowables are about 65,000 barrels a day nearer the indicated demand than were the May allowables. Consequently, if the allowables are observed as well in June as in May, the running of about 2,000,000 barrels of crude to storage will be eliminated. Since the May additions to storage amounted to only a little more than that, it is indicated that practically no crude will go to storage in June.

Inventories Still Moderate

The protracted overproduction of the past four months and the running of about 20,000,000 barrels of crude into storage naturally has caused some misgivings. But priror to the commencement of the overproduction spell, the industry had achieved a remarkably advantageous inventory position, with stocks of all oils at the lowest levels for about 13 years. Consequently, despite the addition of about 20,000,000 barrels of crude to storage in the past four months, the industry still occupies an exceptionally favorable inventory position.

Withdrawals Put Back

Those additions of recent months, in fact, were only the equivalent of putting back into storage quantities that were withdrawn in the latter part of last year.

And at the end of May this year, the industry still had less oil in storage than at the end of May last year. The 305,745,000 barrels of crude held on May 29, 1937, compared with 315,169,000 barrels on hand May 31, 1936.

Thus the crude stocks are about 10,000,000 barrels lower now than a year ago.

The crude stocks are thus smaller, moreover, despite the fact petroleum consumption is running higher this

United States Gasoline Stocks

Finished and Unfinished

(From Bureau of Mines Reports, Figures indicate barrels)

At End of Month	1935	1936	1937
January	58,605,000	62,613,000	71,416,000
February	64,888,000	71,604,000	78,413,000
March	66,290,000	74,485,000	81,651,000
April	58,218,000	73,509,000	†82,273,000
May	61,483,000	71,605,000	*78,758,000
June	59,507,000	67,377,000	.....
July	56,446,000	62,446,000	.....
August	45,932,000	59,496,000	.....
September	51,334,000	57,800,000	.....
October	49,798,000	57,662,000	.....
November	52,046,000	58,799,000	.....
December	56,693,000	62,885,000	.....

†Stocks May 1, as estimated by the American Petroleum Institute.

*Stocks May 29, as estimated by the American Petroleum Institute.

Stocks of All Oils in the United States

At end of each year since 1918, and at end of each month in past year.

(Bureau of Mines Figures)

DATE	BARRELS				Days' Supply
	Crude Oil	Natural Gasoline	Refined Products	Total Stocks, All Oils	
End of Year:					
1918	.....	.....	.....	193,411,000	165
1919	.....	.....	.....	200,383,000	164
1920	.....	.....	.....	209,845,000	156
1921	.....	.....	.....	294,428,000	203
1922	.....	.....	.....	385,349,000	239
1923	.....	.....	.....	492,088,000	235
1924	.....	.....	.....	520,287,000	236
1925	.....	.....	.....	552,464,000	239
1926	.....	.....	.....	527,084,000	210
1927	.....	.....	.....	597,176,000	231
1928	.....	.....	.....	621,010,000	223
1929	.....	.....	.....	†689,497,000	228
1930	411,882,000	3,100,000	251,680,000	666,662,000	224
1931	370,194,000	2,825,000	258,879,000	631,898,000	221
1932	339,875,000	3,203,000	249,116,000	592,194,000	230
1933	354,223,000	3,680,000	244,295,000	602,198,000	226
1934	337,254,000	3,740,000	223,356,000	564,350,000	199
1935	314,681,000	3,698,000	223,371,000	541,700,000	166
End of Month:					
January, 1936	313,081,000	3,936,000	224,318,000	541,335,000	174
February	310,812,000	4,218,000	228,214,000	543,244,000	179
March	313,189,000	4,553,000	231,063,000	548,805,000	183
April	315,389,000	5,058,000	230,672,000	551,119,000	171
May	315,169,000	5,664,000	233,590,000	554,423,000	173
June	311,046,000	5,829,000	233,421,000	550,296,000	161
July	306,390,000	5,846,000	233,262,000	545,498,000	161
August	301,757,000	5,653,000	234,756,000	542,166,000	157
September	295,693,000	4,945,000	231,842,000	532,480,000	146
October	292,271,000	4,555,000	230,605,000	527,431,000	148
November	288,998,000	4,153,000	229,122,000	522,273,000	149
December, 1936	288,184,000	4,055,000	226,407,000	*518,646,000	‡146
January, 1937	286,759,000	4,032,000	229,340,000	520,131,000	155
February	289,972,000	4,290,000	232,314,000	526,576,000	158
March	297,496,000	4,799,000	231,847,000	534,142,000	152

Trend of Crude Stocks since end of March; from Bureau of Mines weekly reports.

May 1	303,249,000	.....	.....	.....	...
May 29	305,745,000	.....	.....	.....	...

† The stocks continued rising in first five months of 1930, reaching a peak of 700,808,000 barrels, May 31, 1930
* Smallest for nearly 13 years, or since March 31, 1924, when total was 511,894,000 barrels.
‡ Smallest for 16 years, or since November 30, 1920, when stocks represented 144 days' supply.

United States Drilling and Production in First Five Months of 1937 and 1936

STATE OR DISTRICT	WELLS COMPLETED			BARRELS OF CRUDE PRODUCTION		
	In 1937 (5 Mos.)	In 1936 (5 Mos.)	Percent Change	In 1937 (5 Months)	In 1936 (5 Months)	Percent Change
Arkansas	32	36	— 11	4,070,350	4,542,250	— 10
California	590	424	+ 39	91,878,800	90,734,370	+ 1
Colorado	6	4	+ 50	612,550	667,950	— 8
Eastern States	1,178	1,249	— 6	17,481,800	15,826,350	+ 10
Kansas	951	590	+ 61	27,861,150	22,486,000	+ 24
Louisiana	308	400	— 23	37,114,400	30,623,100	+ 21
North Louisiana	120	230	— 48	11,177,750	9,693,750	+ 15
South Louisiana	188	170	+ 11	25,936,650	20,929,350	+ 24
Michigan	346	274	+ 26	5,611,000	5,510,550	+ 2
Montana	51	42	+ 21	2,398,700	2,005,250	+ 19
New Mexico	288	202	+ 42	15,394,200	9,565,300	+ 61
Oklahoma	1,275	1,044	+ 22	94,573,600	79,533,150	+ 19
Southeastern States	7	5	+ 40	.....	.....	.....
Texas	5,904	4,788	+ 23	204,344,250	168,260,700	+ 21
East Texas Field	868	1,158	— 25	68,638,150	66,919,250	+ 3
Rest of East Texas	421	128	+229	17,197,700	7,477,100	+130
North Texas	957	850	+ 13	10,374,950	8,800,700	+ 18
South Texas	1,524	1,251	+ 22	*32,868,150	*11,247,500	+ 35
Texas Gulf Coast	590	436	+ 36	*29,662,450	*34,956,550	
Texas Panhandle	272	267	+ 2	11,301,950	9,242,300	+ 22
West Texas	1,092	504	+117	29,362,450	25,798,800	+ 14
West Central Texas	180	194	— 8	4,938,450	3,818,500	+ 30
Wyoming	46	17	+170	7,747,350	5,331,150	+ 45
Total United States	10,982	9,075	+ 21	509,088,150	435,116,120	+ 17

* Fields of Corpus Christi District, now included with South Texas, were shown in Texas Gulf Coast in 1936.

year than last year. In the first three months of 1937, the total demand for United States oils was about 10 per-ent greater than in the similar period of 1936.

Refinery Output Justified

While crude oil production has been running this year above the market demand, the refineries have been better controlled than the wells; and output of the refied products has been fairly well in line with the current and prospective requirements of the consumers.

Although gasoline inventories were built up this spring to the highest peak ever reached, the supplies were largely justified by the prevailing rates of consumption. Subsequently, the gasoline stocks have been showing a normal seasonal decline, with the opening of the period of extensive motoring and heavy consumption.

After having stood at the all-time peak of 83,538,000 barrels on March 27 this year, the total stocks of finished and unfinished gasoline in the United States had been cut down to 81,407,000 barrels by May 1. During May, the total was further reduced about 3,000,000 barrels, dropping to 78,758,000 barrels by May 29 and to 77,494,000 barrels by June 5.

On the latter date, the gasoline stocks were 9.7 percent greater than the 70,639,000 barrels on hand one year previously.

That increase in gasoline stocks is fully justified by the gain that has occurred in consumption. So far this year, the gasoline demand has been running around 10 percent higher than last year.

Fuel Oil Stocks Low

The refinery output of other products also has been well absorbed, and inventories of those products are satisfactory.

Fuel oil inventories are particularly conducive to strong markets and favorable prices, being currently lower than a year ago, while demand has been running materially higher this year than last year. On June 5, 1937, stocks of gas and fuel oil in the United States aggregated 97,402,000 barrels, compared with 102,904,000 barrels on hand June 6, 1936.

It is indicated, consequently, that fuel oil may be comparatively scarce next fall and winter, and that prices may move upward.

Production Exceeds Demand

Although the recent increases in crude oil stocks furnish the best

United States Drilling and Production, May, 1937, and Cumulative for Year

STATE OR DISTRICT	MONTH OF MAY, 1937						CUMULATIVE, JANUARY THROUGH MAY, 1937					
	*Completions	Oil Wells	Gas Wells	Failures	Initial Prod. Bbls. Daily	Total Bbls. Oil Prod.	*Completions	Oil Wells	Gas Wells	Failures	Initial Prod. Bbls. Daily	Total Bbls. Oil Prod.
Arkansas	6	2	....	4	115	845,500	32	9	....	23	815	4,070,350
California	156	115	....	41	62,715	20,244,500	590	438	6	146	221,553	91,878,800
Colorado	....	....	....	....	.....	122,000	6	1	....	5	2,400	612,550
Eastern States	248	70	115	63	2,256	3,645,350	1,178	305	571	302	6,366	17,481,800
Illinois	17	8	1	8	388	.....	37	19	3	15	681	.....
Indiana	6	3	....	3	29	.....	45	15	7	23	156	.....
Kentucky	23	5	9	9	265	.....	79	41	10	28	1,662	.....
New York	1	....	1	....	.....	.....	4	....	2	2	.....	.....
Ohio	98	34	40	24	795	.....	594	148	288	158	2,684	.....
Pennsylvania	15	6	7	2	659	.....	68	19	33	16	726	.....
West Virginia	88	14	57	17	120	.....	351	63	228	60	457	.....
Kansas	250	184	11	55	268,479	6,092,550	951	708	32	211	868,592	27,861,150
Louisiana	97	69	4	24	33,194	7,639,850	308	200	21	87	87,824	37,114,400
North Louisiana	44	34	2	8	12,884	2,385,550	120	83	12	25	28,486	11,177,750
South Louisiana	53	35	2	16	20,310	5,254,300	188	117	9	62	59,338	25,936,650
Michigan	103	64	9	30	40,940	1,380,950	346	185	45	116	100,939	5,611,000
Montana	25	20	2	3	1,815	498,050	51	39	5	7	3,621	2,398,700
New Mexico	75	72	3	....	154,428	3,480,950	288	268	9	11	502,731	15,394,200
Oklahoma	356	260	16	80	273,231	20,264,400	1,275	908	64	303	1,206,077	94,573,600
Southeastern States	....	....	....	....	.....	.....	7	....	....	7	.....	.....
Alabama	....	....	....	....	.....	.....	1	....	....	1	.....	.....
Florida	....	....	....	....	.....	.....	....	....	....	....	.....	.....
Mississippi	....	....	....	....	.....	.....	6	....	....	6	.....	.....
Texas	1,501	1,138	56	307	1,634,014	43,879,450	5,904	4,430	184	1,290	6,275,290	204,344,250
East Texas Field	231	221	....	10	1,016,169	14,294,450	868	834	....	34	3,756,853	68,638,150
Rest of East Texas	113	99	5	9	54,944	3,802,050	421	369	14	38	232,995	17,197,700
North Texas	247	142	4	101	21,460	2,258,750	957	524	8	425	90,283	10,374,950
South Texas	334	219	15	100	91,770	7,208,100	1,524	1,054	53	417	433,673	32,868,150
Corpus Christi	146	113	7	26	63,630	.....	616	482	12	122	282,402	.....
Laredo	138	80	7	51	16,057	.....	708	461	39	208	117,943	.....
San Antonio	50	26	1	23	12,073	.....	200	111	2	87	33,328	.....
Texas Gulf	182	132	13	37	46,488	6,359,600	590	427	29	134	160,579	29,662,450
Texas Panhandle	73	55	17	1	28,178	2,477,650	272	200	58	14	99,362	11,301,950
West Texas	280	256	....	24	374,074	6,430,200	1,092	956	5	131	1,496,030	29,362,450
West Central Texas	41	14	2	25	931	1,018,650	180	66	17	97	5,505	4,938,450
Wyoming	11	7	1	3	5,895	1,637,300	48	32	3	11	20,742	7,747,350
United States Total	2,828	2,001	217	610	2,477,082	103,730,950	10,982	7,523	940	2,519	9,236,950	509,088,150

* May completions cover not the calendar month, but the five weeks, or 35 days, ended May 29.

evidence that production has been excessive, the excess is reflected also in figures on petroleum demand and crude output.

In the first five months of last year, crude production conformed very closely with demand, as evidenced by the fact crude oil stocks changed very little.

The latest available Bureau of Mines figures on demand show that in the first three months of this year total demand for petroleum was 10.4 percent greater than in the similar period last year.

Production, however, has been running materially higher than that above last year's levels. In the first five months of this year, the crude output, aggregating 509,088,150 barrels, was 17 percent larger than in the corresponding period last year.

Most Drilling Since 1926

Attending this year's heavy production of crude, and perhaps partially responsible for the excess of the output above market requirements, drilling has been running at the highest levels for over 10 years, exceeding even the 1929 record.

In May, this year, completions of wells in the United States averaged 80.8 daily. That was the highest daily average since November, 1926, when the completions averaged 85.9 per day.

In the first five months of this year, completions in the United States totaled 10,981 wells. That was 21 percent more than in the similar period last year.

The extent to which drilling has expanded in the past several years is shown by the fact that the 10,981 wells completed in the first five months of this year represented almost as much drilling as in either 1931 or 1933. In 1931 the year's drilling embraced 11,716 completions, and in 1933 the completions totaled 11,700 wells.

Most Areas More Active

Drilling is running higher this year than last year in most of the important oil producing districts of the United States. In Eastern Texas outside the East Texas field the first five months of this year brought more than three times as much drilling as the similar period last year. In West Texas and Wyoming, there have been more than twice as many completions this year as in the opening five months of last year.

EDITORIAL COMMENT

The Right to Work

In the dark days of the depression there was an expression which had current usage and which back of it carried a world of meaning:

"Every man is entitled to an opportunity to work—every man is entitled to a job." This was in the day before our government had adopted the dole with its worst features.

The other day we read of men who, in order to get jobs awaiting them in a steel mill, swam a river, hoping thereby to escape lines of pickets whose expressed intention was to prevent those men, or any men, from exercising their American privilege of holding a job. And only a few days ago we read of militant attempts made to stop a truck loaded with food, consigned to a steel mill where workmen, surrounded by hostile forces, were exercising their American privilege of holding a job.

And a few days before that we read of armed forces, defying the legal authorities of the community, marching on private property with the obvious intention of damaging or destroying it because its owners would not conform to their wishes and because within that property were American citizens exercising their American prerogative of working. Ironically enough, at the head of the procession strode a man carrying an American flag, the staff of which he used to strike the guardians of the law who were bold enough to block his way. (Somewhere we once read of a statute regarding illegal use of the American flag but of course using it as a club against officers of the law may now be preferred usage.)

The full story of the strike situation at the steel mills has not yet had publication. It may never have full publication, but when an engineer, in no way connected with, nor a member of the striking crafts, must spend two days to get permission of a man in no way connected with his company, to visit his own office, and when we are told that this was but a mild instance of the disregard of individual rights exercised by the representatives of John Lewis in the steel strike, we wonder how long it will be before the American people will arise and place behind the bars those men who, not content with their privilege to strike, must go further and deny to American citizens their constitutional privileges. The time surely cannot be far off.

Possible Legislation Holding Interest

By L. J. LOGAN
Associate Editor

ALTHOUGH the oil industry prides itself on maintaining better than average conditions for its employes, there has arisen some concern over the legislation that Congress contemplates regarding minimum wages and maximum hours.

It has been pointed out that such legislation might adversely affect at least the stripper well portion of the oil industry.

In some of the old, settled fields, where the production is scant, the pay of workers necessarily must be modest. Consequently, it is conceivable that wages and hours might be fixed by law at levels that would force the abandonment of some of the nearly depleted properties. And so the owners of stripper wells are sitting up and taking notice.

Timely Subject Furnished

A timely subject of importance has presented itself, therefore, for consideration at the annual meeting of the National Stripper Well Association, which is scheduled for June 17 at Tulsa.

That association is a federation of 18 local oil and gas associations in various sections of the United States where the problems of stripper well operators are of importance.

Oil Workers Fare Well

Despite the uneasiness regarding the stripper wells, however, there still remains a general feeling that the oil industry as a whole probably has less to fear than some other industries in connection with the proposed wage and hour legislation. For it is a matter of record that oil industry workers as a group receive higher pay and work fewer hours than the averages for workers in all industries.

The oil industry finds consolation, moreover, in the hope that it will sell more gasoline and lubricating oil if the contemplated legislation brings about increased recreation time for the public. If workers have more time for leisure, it is reasoned, they will do more traveling and pleasure driving.

Wage Bill Considered

Hearings were continued jointly last week by the labor committees of the Senate and the House, on the administration's bill, which would permit only those industries conforming with stipulated labor standards, to ship their products across state lines.

Government witnesses, in support of the legislation, have emphasized that it is not primarily a labor measure, but general economic legislation taking the form of a fair trade bill; that wages are being considered only as a factor entering into competition generally; that competing companies should be placed on the same footing as to minimum wages that may be paid, just as companies have been put on the same footing with respect to railroad rates.

Sponsors of the wage and hour bill have high hopes it will be enacted and that it will prove constitutional, following the recent Supreme Court decisions upholding the Wagner labor relations act, the Social Security Act, and the Washington state law prescribing minimum wages.

Unions Approve Bill

Contrary to some expectations that labor unions would fight the proposed legislation as interfering with their role in determining wage and hour stands, William Green, president of the American Federation of Labor, and John L. Lewis, head of the Committee for Industrial Organization, have expressed to the Congressional committees their approval of the setting of minimum wages by law. They stressed, however, that the law should provide only the minimum wages and not attempt to prescribe the exact wages or salaries paid to workers.

Standards Proposed

Under the bill that is proposed, it is contemplated that a 40-hour work week would be put in effect among all companies engaged in interstate commerce. It is tentatively suggested, also, that wages should not be permitted to be under 40 cents an hour, or 16 a week. These figures on hours and wages are subject to further discussion.

These standards would not be put into effect throughout the country immediately, but would be applied, industry by industry, by a quasi-judicial board, having authority to make special allowances in special cases.

Oil Workers Get More

It has been pointed out that the petroleum industry would be able to meet these requirements without any important adjustments of present scales and standards, and thus without materially affecting company profits or production levels.

The net effect of the legislation, it is indicated, would be to legalize minimums already observed generally throughout most industries. Among many oil companies, the actual prevailing minimums are much more liberal than the proposed legal standards.

Oil Helps Employment

Latest available government statistics reveal that the petroleum industry has been contributing materially to betterment of employment conditions. The number of oil industry workers currently is materially higher than a year ago. Payrolls are up even more sharply, reflecting higher wages and sala-

On Labor of Industry

Not much anxiety is felt, however, as minimum standards of most oil companies are well above the contemplated legal requirements.

Wage and hour legislation might benefit oil industry, by increasing recreation for workers and by stimulating consumption of gasoline.

ries as well as the larger number of workers.

The Bureau of Labor Statistics, Department of Labor, in its employment data for March, 1937, reported that in the producing division of the petroleum industry, employment was 4.4 percent higher than in March last year. Payrolls were up 14.5 percent. Per capita weekly earnings were 9.7 percent higher in March, 1937, than in March, 1936. Average hours worked per week were 5.9 percent higher. Average hourly earnings were up 2.6 percent.

In the refining division of the petroleum industry, employment in March, 1937, was 5.2 percent higher than in March, 1936, while payrolls were 14.6 percent greater. In the refining operations, per capita weekly earnings in March, this year, were up 8.8 percent over March, last year. Average hours worked showed a gain of three tenths of one percent, and average hourly earnings were up 9.5 percent.

Same As In Early 1935

However, the employment of early 1936 in oil producing operations was somewhat lower than in the similar period of 1935, possibly reflecting in part the voiding of the National Recovery Act. And thus, despite the gain over this time last year, the March, 1937, employment was merely back to the same level as in March, 1935.

Payrolls, on the other hand, show an increase over 1935 as well as 1936.

Employment in Producing

Considering the 1929 averages as 100 percent, the indexes of employment and payrolls in petroleum producing operations for March of 1935, 1936, and 1937 are as follows:

Month	Employment	Payrolls
March, 1935	74.0	56.0
March, 1936	70.7	55.9
March, 1937	74.0.	64.1

In the refining branch of the petroleum industry there has been a more pronounced expansion of employment than in the producing division. The gain in refining operation payrolls, similarly, has been larger.

Considering the 3-year average 1923-1925 as 100, the index of employment and payrolls in oil refining in March, 1937, compared as follows with March of 1936 and 1935:

Month	Employment	Payrolls
March, 1935	107.9	96.4
March, 1936	107.5	103.0
March, 1937	120.5	125.6

Flush Fields Reflected

The above statistics, showing larger gains in employment in refining than in producing operations, probably reflect the fact that for several years much potential crude oil production has been purposely held back through proration, and that increases in production have been possible simply by opening wells wider, rather than by drilling and operating more wells. Instead of employing more workers, companies have been able to some extent merely to have the already employed men to give an added twist of the wrist at the well head, in obtaining increased production.

Unreceptive to Unions

The fact that oil company employes enjoy better than average working conditions probably is partly responsible for the unwillingness of many of the oil workers to become affiliated with any national labor union.

At any rate, the employes of a considerable number of oil companies, including both major and independent companies, have formed their own local unions in preference to joining up with either the Committee for Industrial Organization or the American Federation of Labor. Such courses have been chosen despite the membership campaigns being conducted among oil workers by both of those labor organizations.

Competition for Members

Undaunted, however, by cold shoulders, both the C.I.O. and the A.F. of L. continue pushing their competitive campaigns for members among the oil company workers.

Each of the two big labor organizations is hampered, in the meantime, however, by counter-attacks of the other. Each claims to be the answer to the working man's prayer. And each asserts, not by mere implication, but in loud and defiant words, that the other actually is a menace to the welfare of the workers. Under the circumstances, the oil worker is offered eloquent argument why he should not join either of the big unions. This situation probably is materially instrumental in causing some of the oil workers to form their own independent unions.

Union Claims Growth

The International Association of Oil Field, Gas Well, & Refinery Workers, which is affiliated with the C.I.O., last week in its annual convention at Kansas City, claimed officially that it has more than doubled its membership since January, and that it now has more than one half of the estimated 215,000 oil field and refinery workers on its membership rolls.

It was asserted that the Sinclair, Shell, Cities Service, and Texas companies have signed union contracts with the C.I.O. affiliate, although the Standard companies have not.

PIPE LINE TAX UP
Texas intangible put at $96,073,000

Austin.—An increase of $44,000,000 has been placed by Texas tax officials on the intangible values of Texas oil pipe lines, and hearings on whether these preliminary assessments should be made permanent are scheduled to open June 21.

Until hearings open, officials decline to say by what method they reached a total valuation of $96,073,000 as compared with last year's final assessment of $52,303,500.

Intangible values are taxed at the ad valorem, or property, tax rates within the counties, the board certifying to the county its share of the total in ratio to the amount of the physical property of the line located within the county.

Fundamentally, the intangible is determined by capitalizing the profits of the pipe line at 10 percent to determine a total overall value, from which overall the value of the physical plat is deducted. However, a variation in any one of the many factors which make up this formula increases or decreases the intangible value.

What the tax board declined to reveal in advance was the factor which was so radically changed from last year.

The board embarks upon the valuations this year with the backlog of state court opinions upholding the law under which intangibles are taxed and the methods used by the tax board in enforcing the law. The opinion rendered by the Austin Court of Civil Appeals was in effect affirmed when the Supreme Court refused a writ of error. It is reported that the Texas Pipe Line Company, which brought the test case, plans an appeal to the United States Supreme Court.

WANT LESS OIL
Study means to reduce California production

Los Angeles.—Discussion of methods to be used in an effort to get independent producers of California to reduce their production to the allowable at a meeting for some 50 independent operators in Los Angeles June 7, led to the appointment of a committee of three, composed of Clifford Lord, Dana Hogan and James Michlin, which was instructed to discuss the situation with the central committee and to see the various field committees.

Daily production has been running from 60,000 to 70,000 barrels over the allowable and it is felt this situation is holding off an increase in the price of crude oil in the state.

NO 40-HOUR WEEK
Few trained drillers in Alberta is reason

Calgary.—The threat of enactment of a 40-hour week by the provincial government's department of labor for workers in Turner Valley oil field of Alberta, Canada, was definitely removed last week, eliminating the possibility that drilling operations would be restricted to five days a week.

Workers united with operators in petitioning the government to withhold restrictions which might seriously hamper development in the Turner Valley field. Herbert Greenfield, Calgary, president of the Oil & Gas Association of Alberta, met with provincial government officials in Edmonton and explained that enactment of a 40-hour week in the field, in view of the shortage of experienced drillers, would seriously curtail operations and force operators to limit drilling to five days a week. He presented a petition signed by 350 workers supporting the stand of the operators.

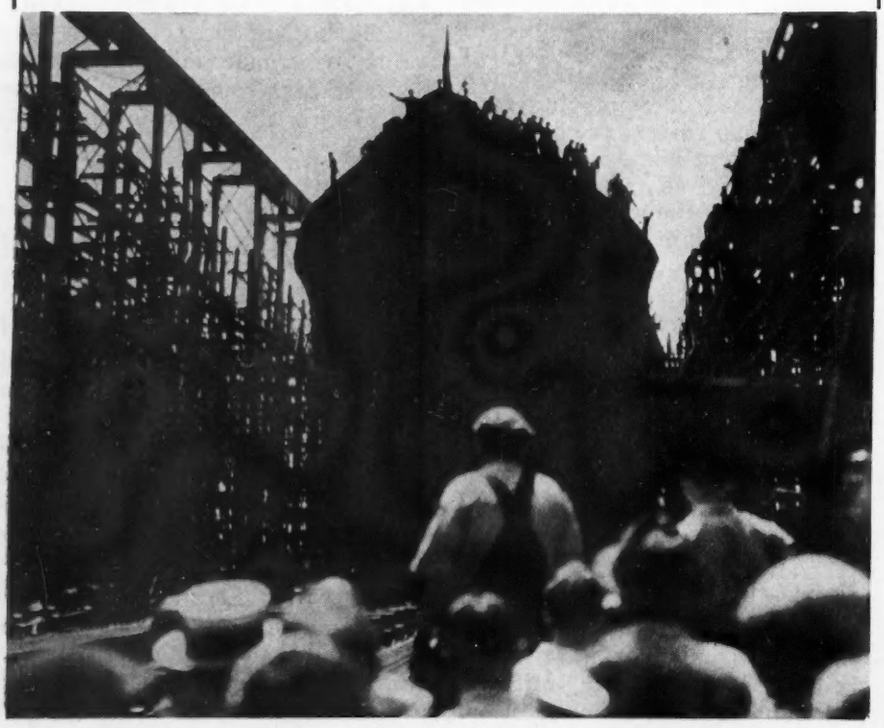
Following Greenfield's conference with provincial officials, Hon. Dr. W. W. Cross, minister of trade and industry, announced no order limiting the hours of work would be issued. He explained that, following a petition asking a shorter week, a three-man commission had been sent into the field to interview workers and operators on the proposal, and found the working men were not favorable to such a move. The commission recommended against ordering a 40-hour week, Dr. Cross said.

Launch 100,000-Barrel Tanker

Christened the *Louisiana* by Mrs. Richard W. Leche, wife of the Governor of Louisiana, a new 100,000-barrel oil tanker was launched Saturday, June 5, at the Sun Shipbuilding and Drydock Corporation, Chester, Pennsylvania. Mrs. Leche christened the ship in the presence of her husband the Governor, and other prominent Louisiana officials, as well as officials of the The Texas Company, owners of the vessel.

The new tanker, a motorship, is the first of three to be launched within the next few months. She has an overall length of 490 feet, six inches, with a moulded beam of 65 feet, and a moulded depth of 43 feet, three inches. She is of 12,630 dead weight tons, and is capable of a speed of 13½ knots.

The *Louisiana* will go into service between "Port Texaco," near The Texas Company's producing facilities in Terrebonne Bay, Louisiana, and Port Arthur, Texas, site of Texaco's largest refinery.



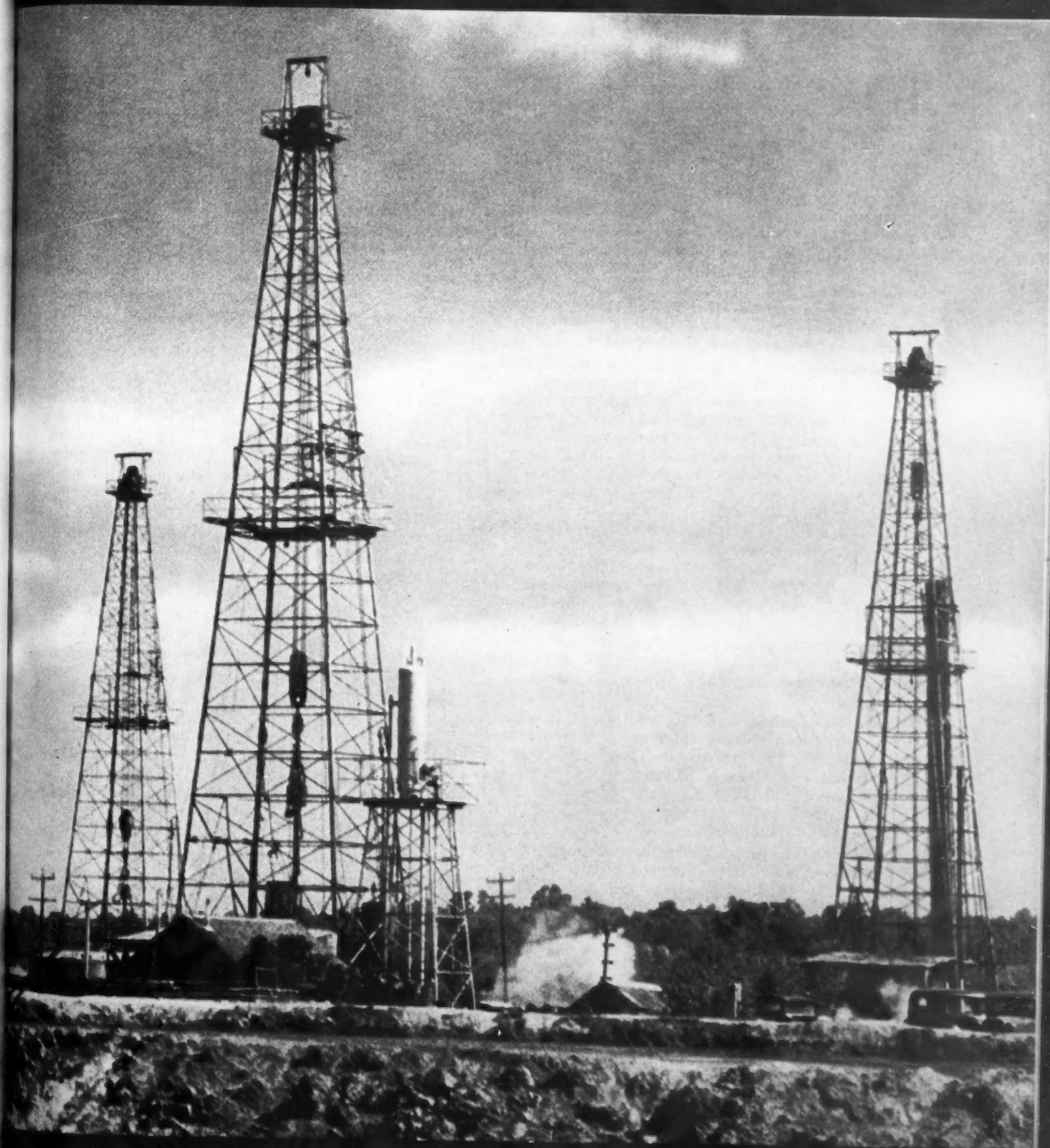
PERMITS EXTENDED
Prospecting licenses good through December, 1939

Washington.— Automatic extension of all outstanding oil prospecting permits until December 31, 1939, is provided for in a bill approved by the House of Representatives June 9.

The measure, introduced February 3 by Representative Greever of Wyoming, provides in effect for continuance of the two-year extension granted by legislation approved in 1937, affecting some 7000 permits.

It was explained that extension was dependent upon agreement to develop any new findings under approved unit plans, but the regulations covering the legislation were not issued by the secretary of the interior until a year after enactment of the bill, and due to insufficient personnel only 44 out of 1300 unit plans submitted have thus far been approved and 1083 have been refused.

EXPLORATION AND DRILLING ENGINEERING PROGRESS DURING



Drilling Practices

ROTATING SPEEDS AND WEIGHT ON BIT RECEIVE ATTENTION

By BRAD MILLS, Associate Editor

THE past year was filled with achievements that reflected rapid advancement in operating technique. Actual drilling practices are so interwoven with the use of equipment that it is difficult to discuss methods without treating equipment as a subsidiary subject. Practices may appear a less tangible group item than equipment, but in actual field work they are equally as important.

Good drilling practices consist largely of the correct use of proper equipment and materials. Such factors as weight on bit, rotating speed, size of hole, and reaming practices involve the human element, however. The application of common sense always accompanies the successful use of good equipment.

In the completion of wells, maintenance of pressure on the formations during drilling difficult formations, the decision to ream or cement, number of lines used on the traveling block, steam pressure, and other electives, failure or success should be attributed to the method of attack and not to the selection of equipment. Several successful deep drilling projects of the past year were completed with ordinary equipment, unusual drilling practices having played the chief part in the attack on formation and pressure problems.

Progress in all phases of deep drilling could not have been so prominent without advancements in both methods and equipment. The handling of abnormal pressures, penetration of troublesome formations, attainment of record depths in several producing districts, and faster drilling time reflect the value of new practices that were not necessary a few years ago.

With 1937 methods and 1927 equipment, it is possible to drill to a much greater depth than was recorded in 1927. This proves the superiority of present practices over those of 10 years ago. Conversely, it is impossible to drill as deep today with 1937 equipment and 1927 methods as with both 1937 equipment and methods.

Present drilling depths have been brought about by evolution. Hundreds of improvements, abandonment of many practices, and constant thought have been the chief contributing factors to the drilling programs of today.

Rotation Speed Studied

Speed of drill pipe rotation and weight carried on the bit are closely related to drilling footage. Several producing companies and drilling contractors studied the action of these factors on drilling progress, and during the past year were able to draw definite conclusions. The relationship between correct speeds and weights has been suspected or known for years, but lack of agreement and limited research in many districts have been conspicuous.

The trend for several years has been toward more rapid rotating speeds and reduced weight on the bit. When the driller of the old school needed to make hole rapidly, he simply increased the weight on the bit. He usually made an adjustment of the rotating speed and perhaps in the volume of mud circulated, but those changes generally were not in proportion to the increased weight on the bit. The result too often was a crooked or wandering hole that reflected the mashing and grinding action of the bit.

Want Straight Holes

Recognition of a straight hole as a good investment has forced operators to seek the most effective drilling methods. Several of the older producing fields are full of crooked holes, and all these producing areas have given trouble during the pumping and cleaning-out stages. The tendency toward increased drilling depths also forces the recognition of straight drilling.

Major companies in California, the Mid-Continent and the Gulf Coast have been attempting to measure and check drilling progress against weight carried on bit and speed of rotation. The results of recent changes in weight on bit and rotating speeds have been enlightening, and tend to show a weakness of many old drilling ideas that had been accepted for years in districts difficult to drill.

Theoretically, it is impossible to determine either the rotating speed or the weight that should be applied on the bit in any given formation. Experience, trial and error, comparison and contrast, and the ability to keep making straight hole serve as the true measure of value of any weight or rotating program.

In several districts where hard formations predominate, high rotating speeds are not as effective as reduced speeds. Light weight on the bit and high rotating speeds failed to give the desired results, and it was necessary to reduce the speed of rotation and carry the same weight that had failed with the very rapid rotation. The excessive rotating speeds seemed to wear out the bit without cutting the formation. This condition has been observed particularly in hard lime strata and in fine, well cemented sandstones. In one district a rotating speed of 150 revolutions per minute wore out the bit and resulted in failure to make hole below 9000 feet. Reduction

of the rotating speed to 90 revolutions per minute gave good results and sharply reduced bit wear. Experience in drilling the hardest and toughest formations has proved that the critical rotating speed is considerably lower than in the softer formations.

During the past year serious attempts to determine the best average rotating speeds for various formations have been interesting, but opertors do not agree on any "cut and dried" program. This lack of agreement should be expected where the equipment, steam pressure, circulation of mud and other factors are so varied.

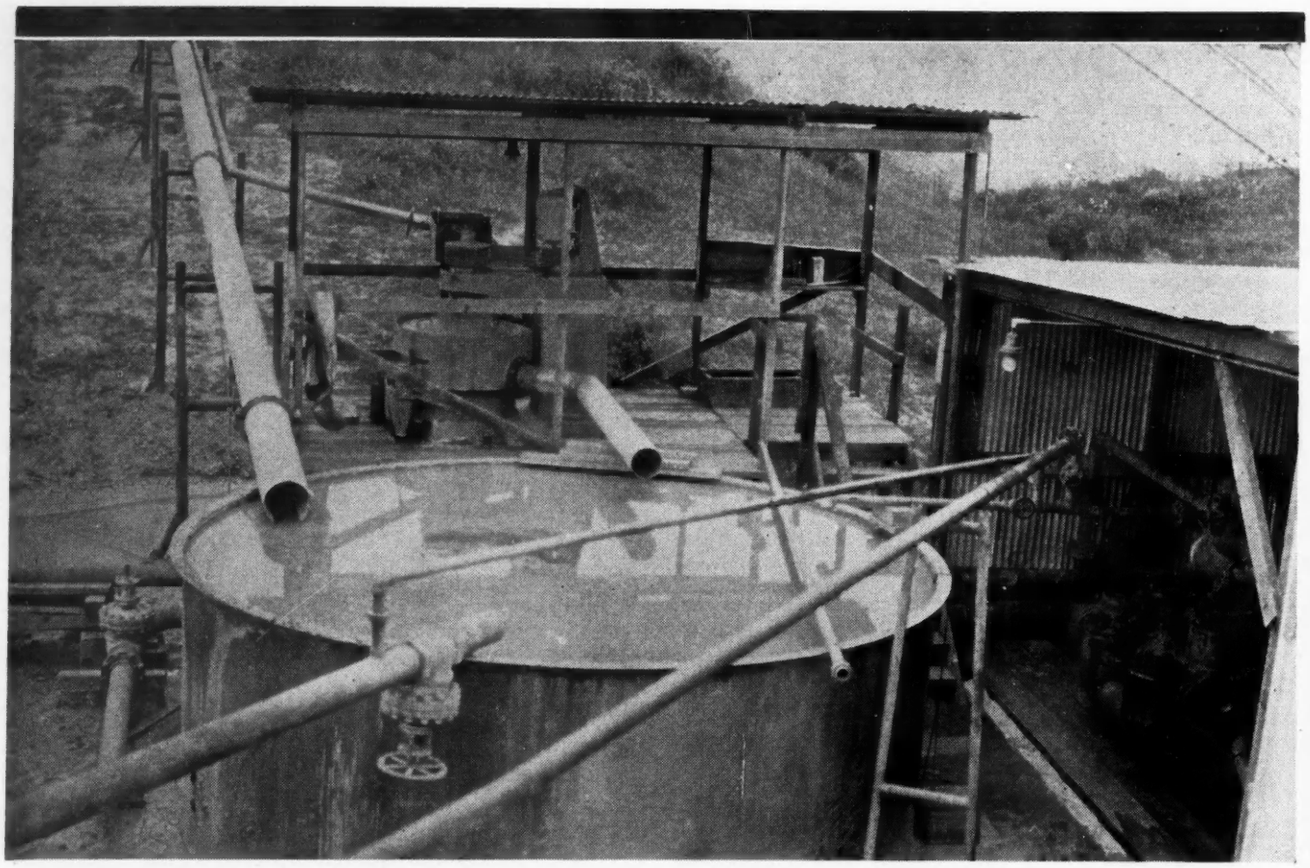
A major company attempts to carry from 1½ to four points of weight on the bit in drilling hard formations below 7500 feet, the objective being the maintenance of a weight roughly equivalent to the weight of 10 or 12 joints of heavy hydraulic drill pipe used in the lower section of the drill pipe string. This weight offered a supporting effect to the main drill pipe string, and placed most of the weight on the short lower section best suited to carry it. Where the conventional drill pipe is used to bottom, a weight adjustment may be necessary.

Hard formations that show a tendency toward brittleness may be drilled successfully at very high rotating speeds. It always is the question of the bit and equipment against the formation, and only experience will give the operator the information he needs. A few formations are surprisingly tough and flinty, and even approach steel in hardness. In drilling such formations, the weight on bit and speed of rotation necssarily play an important part. In many formations extremes of any kind are to be avoided. The highest and lowest rotating speeds, and lightest and heaviest weights on bits usually give poor results.

Rotating speeds vary from 75 to 250 revolutions per minute, the proper speed being governed or affected by several factors. Equipment must be considered, even where the necessity for high speeds is indicated. Where there is danger of excessive breakage, it may be better to rotate at reduced speeds than to attempt to rotate at an excessive speed that would give increased drilling footage. The strength of the drill pipe, mud volume, and nature of the formation are the chief factors in determining the rotating speed.

In South Louisiana drilling has reached a very advanced stage, as evidenced by the large number of near-record depth wells completed during the past year. In this district it has been possible to rotate the drill pipe at high speeds while maintaining a good weight on the bit. The formations in this area are soft and drill easily, yet they stand up remarkably well under a disturbance that would lead to caving in less stable formations. Rotating speeds as

Double drawworks are regularly installed in a number of deep Southern Louisiana fields. Other surface equipment also possesses a high safety factor.



More attention was paid to mud conditioning the past year. In the center background is a mud desanding unit in use at Kettleman Hills. The centrifugal machine removes excessive quantities of sand from the mud returns.

high as 200 revolutions per minute have been attained while drilling from the surface to about 7000 feet. A few crooked holes have been drilled during this "speed campaign," and it has been necessary to reduce the weight on the bit in a few areas.

A major company experimented with the highest rotating speeds that could be applied in the Roanoke field, but the effort backfired in an unexpected manner. The surface equipment failed before the drill pipe and bit gave trouble. The rotary drilling chain showed a very short service life, and repeatedly broke under the high speeds. It developed, however, that the chain failed from lack of lubrication and not from poor quality or lack of strength.

In one South Louisiana field rapid rotation of the drill pipe and controlled weight on the bit have helped to establish drilling records that will be difficult to break. Use of a large mud volume practically enables the "washing out" of hole, in lieu of the usual cutting and drilling action of the bit. High rotating speeds have proved especially effective, but it has not been possible to apply heavy weight on the bit without deviating from the vertical on short notice. Drilling speeds as high as 200 revolutions per minute have not been uncommon.

In the Ventura Avenue, California, field, rotating speeds approaching 300 revolutions per minute were attained during experimental drilling periods. This very rapid rotation gave the operator an opportunity to study both equipment service and drilling progress. During short periods of the maximum rotating speeds, the surface equipment showed signs of wear that were not present at reduced rotating speeds. The high rotating speeds also indicated that drill pipe had its limitations when used in drilling below 5000 feet. The tests at Ventura Avenue did not point to a need for higher rotating speeds than the maximum now in use in several districts. The tendency toward making straight hole was pronounced at high rotating speeds, when weight was properly controlled, but the wear on equipment increased at a rapid rate as rotating was advanced.

The force of an ordinary impact varies as the square of the speed of the blow. Doubling the rotating speed increases the force of the bit impact four times. Theoretically a speed of 200 revolutions per minute gives a bit impact four times as great as a table speed of 100 revolutions per minute. Lack of drilling progress in a few districts indicates that in the hardest formations a fast rotating speed gives a chiseling and shattering effect, rather than the uniform grinding effect that is wanted. A reduction in the rotating speed actually has resulted in increased drilling progress.

A large Gulf Coast company uses moderate rotating speeds for average drilling conditions. This company rotates the drill pipe at 90 to 125 revolutions per minute, and probably gets more service from its drilling equipment than any operator in the district. Only during straightening operations has a high rotating speed been used. This company also has been operating a test rig in making a study of the effect of various rotating speeds, weight on bit, pump pressures, and torques on drilling progress. The relationship of various rotating speeds to wear-and-tear on equipment also has been studied. An analysis of results convinced this company

that extremely high rotating speeds are not required along the Gulf Coast except in reaming and straightening operations. It also was shown that pump pressures and weight on bit are closely connected with drilling progress.

Drill pipe does not respond uniformly to rapid rotation at various depths. A large company found through experiments that the drill pipe has a distinct up-and-down action during very rapid rotation. This rising and falling action tendency was easily observed during the drilling of the first few hundred feet of hole, then decreased as more drill pipe was added. Recent experiments prove that extreme whipping and wabbling of drill pipe usually was accompanied by a rising and falling tendency of the bit. The use of tool joints with large outside diameter on five-inch drill pipe strings offers a number of advantages where the drill pipe shows a tendency to whip and wabble. This combination more nearly fills the hole and adds a steadying influence. A disadvantage of use of the larger connection is the danger of sticking the pipe in soft or caving formations.

Use Heavier Pipe

The use two years ago of heavy drill pipe on bottom helped to establish a depth record in West Texas. Since that time several companies have used from 200 to 300 feet of heavy hydraulic pipe on bottom to add a steadying influence to the entire column. Several difficult fishing jobs resulted from breaks just above the drill collar, and the use of the heavier bottom section almost eliminated the trouble. Higher sustained rotating speeds are possible with the heavier bottom section, while the increased rigidity offers several advantages. In using this combination, one company attempts to place the greatest pipe weight near the bit. This permits the suspension of the entire weight of the smaller diameter drill pipe, while permitting only the weight of the heavier pipe to rest on the formation.

Rotating speeds have been increased during the year in California, the new deep production and the desire to complete wells in a short time having affected all phases of drilling operations. Control of weight is being maintained, however, and a recurrence of the crooked hole campaign that marred operations at Santa Fe Springs and Long Beach is not expected.

Weight carried on the bit probably affects drilling progress as much as any other phase of operations. The weight that may be carried is affected or governed by the size and strength of the drill pipe, the type of bit used, the formation, and the size of hole. Until a few years ago it was common practice to add weight on the bit when progress seemed slow. The addition of weight would have been one of several necessary changes, but it usually was not accompanied by a corresponding increase in mud volume and rotating speed. Any weight carried on the bit is permissible, so long as it is within the limits of the drill stem and permits drilling a straight hole. The maximum rotating speed must take into consideration the possibility of fatigue or failure that comes with unexpected changes in formation. The weight that gives the greatest drilling speed may be used as a basis for any drilling program, but such a weight usually is tempered by other factors. It may be impossible to drill a straight hole with the weight that gives greatest drilling speed, and equipment also may prove inadequate.

A South Louisiana operator has successfully developed an 8500-foot oil field with a drilling program that gave uniform results. The formations were almost ideal for wall building, and it was possible to maintain a rotating speed of 150 revolutions per minute and an average weight of 2½ points while drilling at the rate of 1200 feet per day. The pumps practically washed out the hole. In other Gulf Coast fields, the weight on the bit varies from 1½ to 4½ points.

The necessity for carrying a uniform weight on the bit has been demonstrated during difficult operations of the past year in several districts. A uniform feed keeps the bit on bottom and prevents unnecessary shocks that occur with careless or irregular feeding.

Operators do not agree on the use of mud fluid in certain types of drilling operations. The relationship between mud volume and pump pressure, and speed of rotation and weight on bit has been pronounced, and operators are forced to place all of these factors into one combination in attempting to improve drilling time. One Gulf Coast operator and several California companies favor a heavy use of the slush pump in all formations, but a Gulf Coast company favors the conservative use of the mud pump. It is believed by this lone operator that heavy use of the pumps often loosens slugs of gumbo and sticky formations and adds unnecessary friction near the bottom of the hole. In the sand and shale strata this company favors the increased use of the slush pump, however.

A jetting and sluicing mud action is far from objectionable in soft formations that stand up well, but heavy or intermittent use of slush pumps is avoided in certain caving formations. Most of the larger companies agree that the lightest mud capable of floating the cuttings to the surface is a good weight to use. A dozen other factors enter the picture, however, and the weight, viscosity and nature of the mud must be changed to meet operating conditions. Many operators prefer a 10-pound per gallon mud when drilling favorable shallow formations, with a gradual weight increase as the more difficult formations are encountered or as the likelihood of gas or water pressure develops. The lightest mud that gives a good safety margin and brings the cuttings to the surface is a good fluid to use.

The trend toward starting a smaller hole has been prominent in several producing districts, particularly in the Gulf Coast, where fewer casing strings are run than in other deep producing areas. The energy and cost required for making a large hole are greater than for a small hole, although the danger of tapering a deep hole to a very small size is present where there is the likelihood of running an extra string of casing. Many operators favor starting the smallest diameter hole that will permit reaching the objective formation with a hole of satisfactory diameter. In wildcats or in exploratory tests, large diameter holes are started as a precautionary measure, but even in this type of operation the trend has been toward a smaller diameter hole. In several fields it has been possible to eliminate one casing string by the use of heavy mud while drilling through water strata that formerly were cased off.

Drilling time has been reduced almost 50 percent in several fields that offer serious operating problems. In the older fields that have had several stages of development, it now is possible to drill to 4000 or 5000 feet in one-fourth of the time required 12 or 14 years ago. No one practice has been responsible for the greater part of this progress, more than a dozen improvements and changes having been combined to give the superior operating technique of today.

10,000-Foot Drilling

BECOMING QUITE COMMON, AND IS OF INDUSTRIAL IMPORTANCE

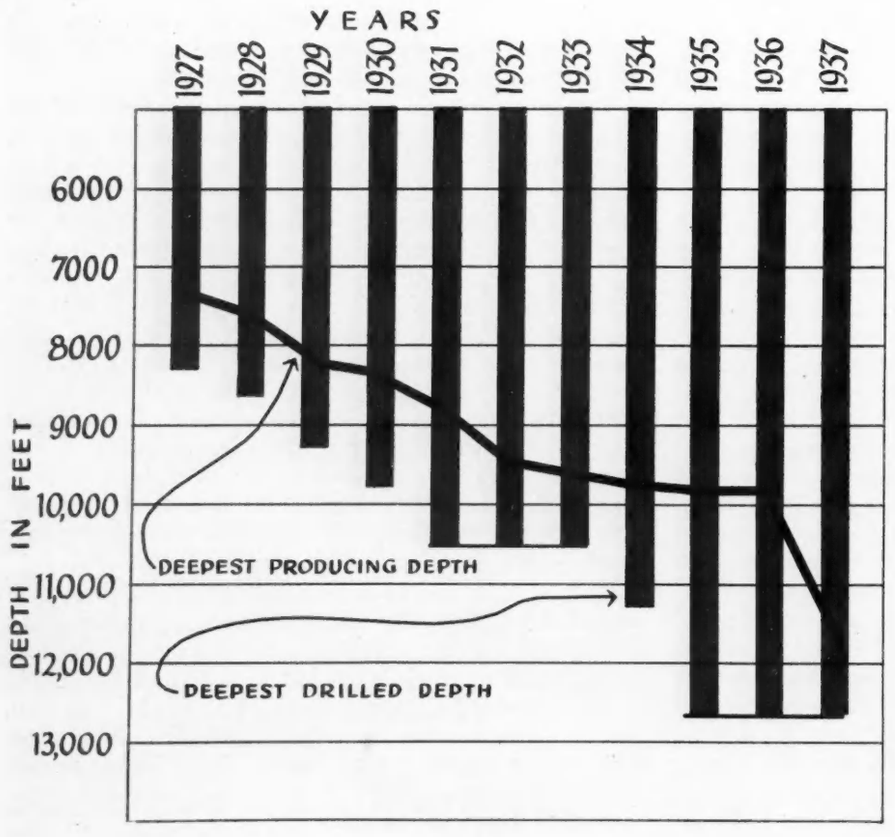
By WARREN L. BAKER, Editor

No discussion of advancements in drilling technique is at all complete unless much stress is placed upon the trend toward deeper drilling. The ability to drill great depths is a definite indication of improved practices and equipment, and also is of vast economic importance, as it brings within reach of the bit additional petroleum supplies. The year 1937 will go down in the industry's history as marking the time when 10,000-foot and deeper drilling became a common, rather than an uncommon, occurrence. Such deep holes are being drilled with remarkable regularity today. Therefore, recent years have seen important improvements in both equipment and methods, and the present trend toward drilling tests deeper presages the discovery of previously unreachable crude reserves.

The trend toward deep drilling is best shown by the statistical record. Seventy-two years of oil industry history passed before a single test achieved a penetration of 10,000 feet. Yet, in the scant six year interval since that mark was first established a total of 47 tests have bored to that level or a greater one. Of the 47 tests that have gone below 10,000 feet, 22 of them have been actively engaged during 1937, although but five months of this year have passed. The 22 tests of this year represent nearly half of all the 10,000-foot holes, and doubles the number drilled in any previous year, which was 1936.

Record Shows Trend

Moreover, within the past 10 years an additional 4000 feet has been added to the record for deep drilling, having increased from slightly below 8000 feet in 1927 to 12,786 feet. This means that wherever producing formations are favorable for deeper production, which is in a very large part of the United



Ten year record of deep well drilling and producing.

10,000 Foot and Deeper Drilling By States or Countries, By Depth, By Years

(Data as of June 1, 1937)

State or Country	Number 12,000-Foot Tests				Number 11,000-Foot Tests					Number 10,000-Foot Tests								Total All Tests 10,000 Feet or Deeper							
	1935	1936	1937	Total	1934	1935	1936	1937	Total	1931	1932	1933	1934	1935	1936	1937	Total	1931	1932	1933	1934	1935	1936	1937	Total
Louisiana	0	1	3	4	0	0	0	0	0	0	0	0	0	4	2	8	14	0	0	0	0	4	3	11	18
California	0	0	1	1	1	0	1	0	2	1	1	0	0	1	1	5	9	1	1	0	1	1	2	6	12
Texas	1	0	0	1	0	1	0	1	2	0	0	0	1	0	2	4	7	0	0	0	1	2	2	5	10
Oklahoma	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	0	2	1	0	0	1	0	1	0	3
Mexico, N. A.	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	2	1	0	0	0	0	1	0	2
Roumania, Europe	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Iran, Asia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1
Totals	1	1	4	6	3	1	1	1	6	3	1	0	1	5	8	17	35	3	1	0	4	7	10	22	47

States and in many parts of the world, it is possible to test 4000 more feet today than 10 years ago.

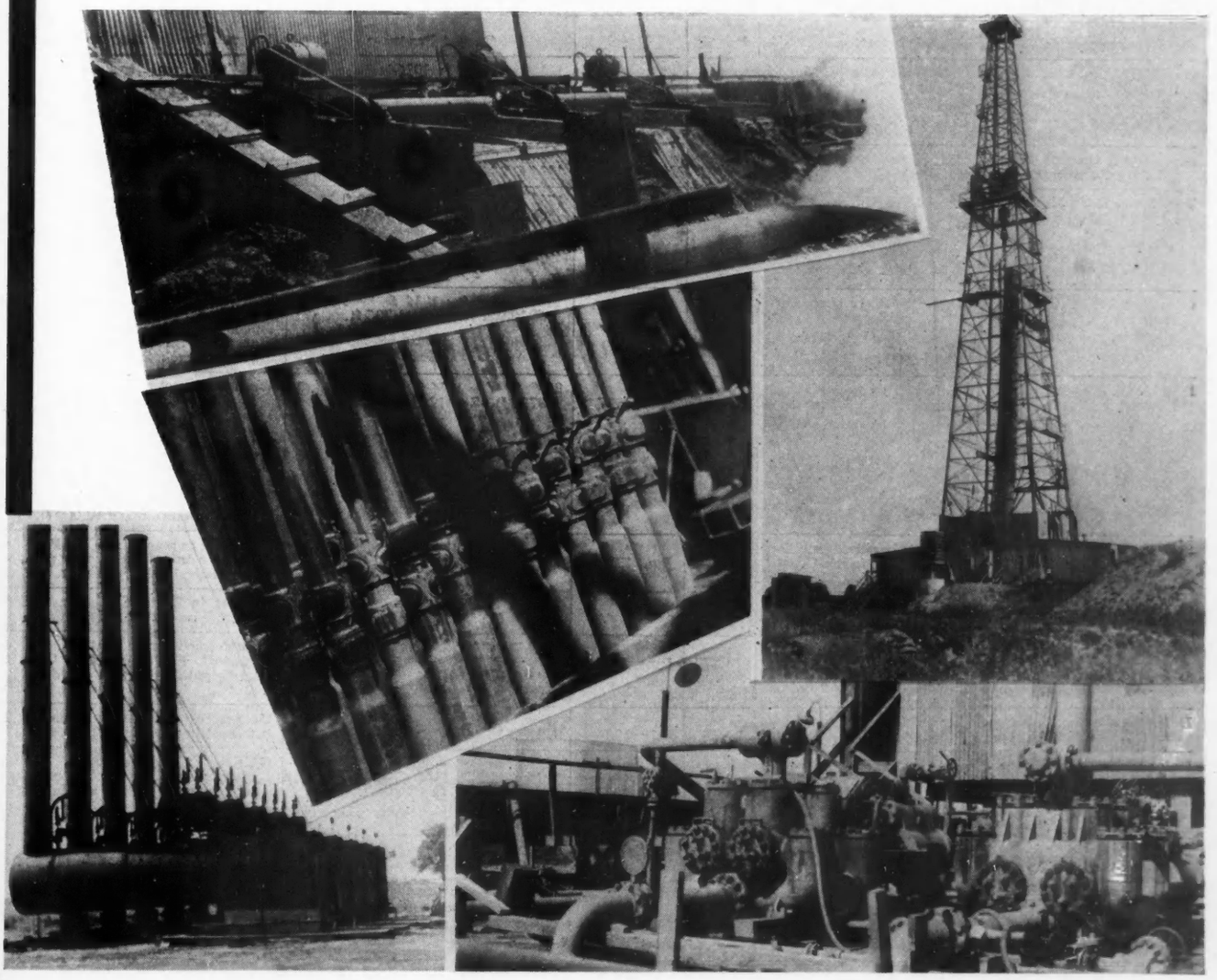
What this means in the way of discovering additional reserves is attested by the curve of the deepest producing wells, which has followed a line closely parallel to the longest tests drilled. In 1927, the deepest producing well was approximately 7500 feet, whereas today it is 11,620 feet. This reflects the same margin of increase as achieved in deep drilling, namely 4000 feet.

The increase in deepest drilling depths and producing footage, generally speaking, has been on a gradual plane. Of course, whenever world record breaking wells, either productive or merely for drilling, have been completed the curves have fluctuated, but over the years, with the exception of several periods, the trend has been fairly even.

Of Economic Importance

A new petroleum discovery era is the likely outcome of the present "super" deep drilling trend. Such operations will open vast new crude reserves. Many areas carry production at deeper depths than whence they are producing today, and in some lo-

Scenes at the most recent 12,000-foot test, and the second deepest ever drilled—Superior Oil Company and Union Oil Company's K. C. L. 8, Kern County, California, which reached 12,618 feet two weeks ago.



calities the drill has not reached the upper-most productive horizon as yet.

Ever since that eventful day in 1859, when Colonel Edwin Drake completed the world's first oil producing well, the industry has depended upon the bit penetrating deeper and deeper to find the volume necessary to meet consumption. And, it has always been successful.

Some idea of the importance of deeper drilling can be procured from just a few of countless examples. The Oklahoma City field structure was known to exist many years ago, in fact was recorded in state geological bulletins. During the course of years, approximately half a dozen wells were drilled in what is now its producing area, but it was not until December, 1928, that the first test went to 6000 feet and discovered the prolific crude reservoir that existed all the time. The same is true of Kettleman Hills. The history of the petroleum industry is literally filled with such occurrences; they are happening today, and will, undoubtedly, occur in the future.

There can be no doubt that production may be obtained, where conditions are favorable for its accumulation, at depths below 10,000 feet. Six commercial producing wells have been completed below 10,000 feet during 1937. If these wells had not been carried so deep, they would have failed to discover petroleum.

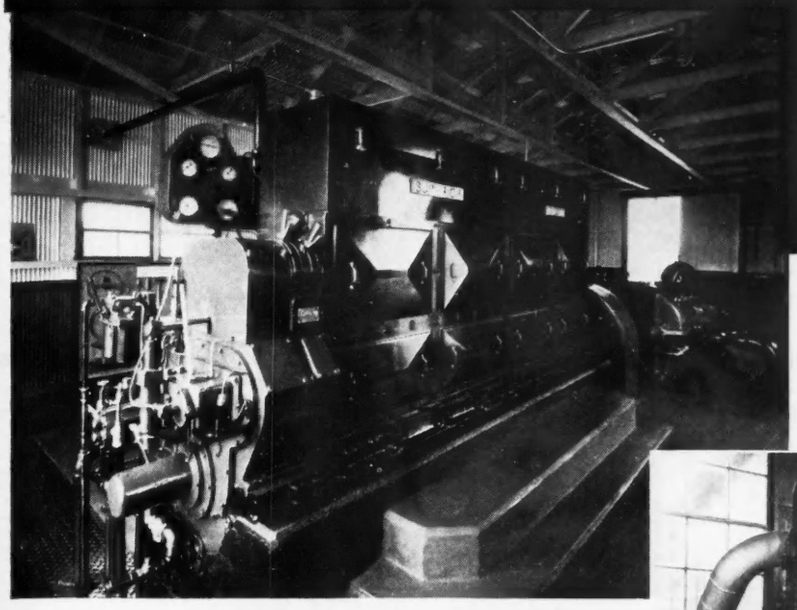
Many fields produce from a number of horizons. The Fitts field of Oklahoma produces from eight different sands, one underlying the other, and the Saxet field at Corpus Christi, and many others, have similar situations. Each new sand found productive really constitutes the discovery of a new field. It is to be anticipated that many present producing fields will be tested to deeper horizons, and that a number of them may carry crude oil.

There is another important economic angle to be considered in connection with deep drilling. Past history of the industry shows that as methods of drilling are developed to make possible exploration to increasingly greater depths, there are discovered new petroleum fields and deeper lying horizons in old fields, and that these are of greater magnitude. Generally speaking, the deeper sands are more prolific, and produce oil of higher quality. This is very important, as the higher the quality of the oil, the lighter it is, and this characteristic permits it to flow more freely. Consequently a greater percentage

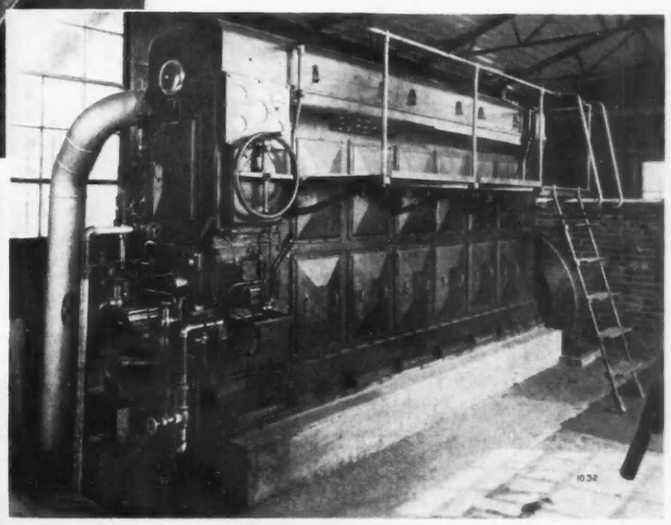
Tabulated History of World's 11,000 and 12,000-Foot Tests
(Data as of June 1, 1937)

Company and Well	Location	Depth	Date	Casing Program	Records Established and Remarks
Gulf Oil Corp.'s McElroy 103	Gulf-McElroy field, Upton County, West Texas	12,786	May, 1935	15½-in. 762 ft.; 10¾-in. 4017 ft.; 7⅝-in. 10,301 ft.	World's deepest test. World's first 10,000-ft. casing string. First 12,000-ft. hole. Spudded March 21, 1933. Several shows below 10,000 ft. Plugged back to 3384 ft.
Superior Oil Co. and Union Oil Co.'s Kern Land 8	Near Ten Section, Kern County, Calif.	12,618	May, 1937	13⅜ @ 1347 ft.; 7 @ 10,380 ft.	Deepest in California. Second deepest in world.
The Texas Co.'s Horseshoe Bayou 1	Wax Lake Prospect, St. Mary Parish, La. Coast	12,261	May, 1937	17⅝ @ 59 ft.; 13⅜ @ 1496 ft.; 7⅝ @ 10,975 ft.	Fifth in world to reach 12,000 ft. Longest string of 7⅝ in world. Third deepest in world. Blew out May 20, 1937, burned one hour, then bridged. Preparing to test or drill deeper. Spudded Sept. 4, 1936.
Continental Oil Co.'s Hebert 1	Abbeville, Vermilion Parish, Louisiana Gulf Coast	12,216	Dec., 1936	18⅝ @ 248 ft.; 13⅜ @ 1882 ft.; 7 @ 10,947 ft.; 5 @ 11,795 ft.	Fourth deepest test in world. Second in Louisiana. Second 12,000-ft. hole Second longest casing string, longest at time. Strong pressure 12,210 ft. Plugged back. Spudded April, 1935.
Humble Oil & Refining Co.'s Ellender 1	Houma, Terrebonne Parish, Louisiana Gulf Coast	12,165	May, 1937	26 @ 260 ft.; 13⅜ @ 2824 ft.; 9⅝ @ 8735 ft.; 7 @ 12,097 ft.	World's deepest producing well. Flowed 1000 bbls. choked after plugging back to 11,620 ft. First 11,000-ft. producing well. Seventh to produce oil below 10,000 ft, World's deepest perforating job at 12,014 ft. World's deepest wire line coring job. Longest casing string in world, the first below 12,000 ft. Longest string of 9⅝ inch ever run. Fourth well to reach 12,000 ft.
Stanolind Oil & Gas Co.'s Stovall 1	South Abbeville, Vermilion Parish, Louisiana Coast	12,128	Jan., 1937	Only surface pipe at 1980 ft.	Third test to reach 12,000 ft. Fifth deepest ever drilled. Record for amount of open hole, having 10,148 ft. uncased.
Continental Oil Co.'s Robbins 2	Citrus Grove, Matagorda County, Tex. Gulf Coast	11,612	May, 1937	20 @ 230 ft.; 16 @ 2665 ft.; 11¾ @ 6420 ft.; 8⅝ @ 8910 ft.	Deepest in Texas Gulf Coast. Drilled much heaving shale.
General Petroleum Corp.'s Berry 1	Belridge, Kern County, Calif.	11,377	June, 1934	20 @ 728; 13⅜ @ 4534 ft.; 8⅝ @ 7752 ft.; 6⅝ @ 9717 ft.; 4½ liner @ 11,377 ft. with 7-ft. gap at 9623-9616 ft.	Once deepest test in world. First 11,000-ft. test. Now deepest in California, and eighth deepest in world.
Denver Producing & Refining Co.'s A-Dah-Noe 1	Binger, Caddo County, Oklahoma	11,230	July, 1934	15½ @ 126; 9 @ 6238; 6⅝ @ 9922 ft.	Deepest in Oklahoma. Second 11,000-ft. test in world.
Union Oil Co.'s (formerly North Kettleman Oil & Gas Co.'s) Lillis-Welsh 1	Kettleman Hills, Kern County, Calif.	11,147	Feb., 1936	18⅝ @ 1087; 11¾ @ 6710; 8⅝ @ 9081 ft.; 6⅝ @ 10,813 ft.	Officially abandoned Sept. 30, 1936, after many months of attempting to overcome fishing job and in redrilling to test strong pressures encountered. Longest string of 6⅝-inch casing.
Humble Oil & Refining Co.'s Pollock-Gulf 1	Upton County, West Texas	11,144	Nov., 1935	15½ @ 340 ft.; 10¾ @ 4338 ft.; 8⅝ @ 8728 ft.	Second Texas test to reach 11,000 ft.
Credit Minier, S. A. R. Chitorani 1	Ploesti, Roumania	11,092	July, 1934	16 @ 594; 8⅝ @ 7977 ft.; 5¾ and 5½ combination liner @ 11,021 ft.	Deepest test outside United States. First 11,000 ft. perforating job. Perforated 10,727 to 11,021 ft. Only 11,000-ft. test outside United States.

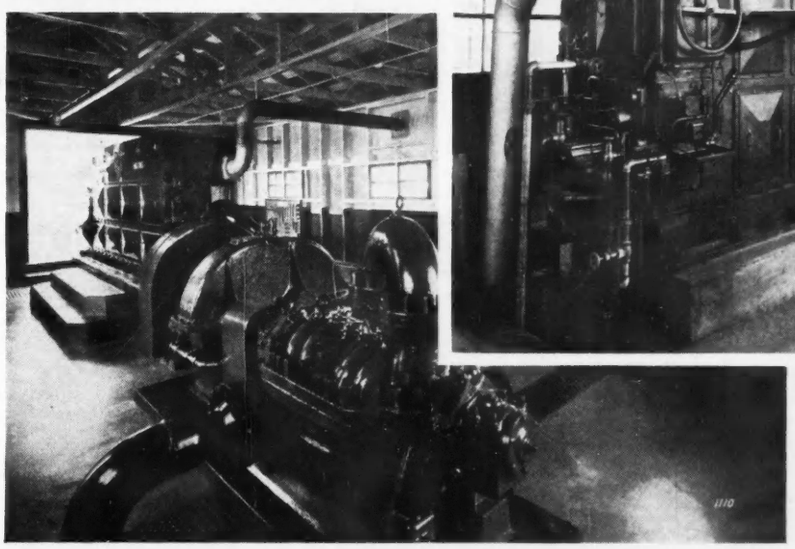
Superior DIESELS IN PIPE LINE STATIONS



Slow speed and medium speed models for step-up gears to centrifugal pumps, or for plunger pumps . . .



Two views of 350 H. P. medium speed DIESEL



Convertible to Gas

Above 400 H. P. Slow Speed

A variety of cylinder sizes, with ratings up to 800 H. P.

National

THE NATIONAL SUPPLY COMPANY OF DELAWARE

DIVISION OFFICES: PITTSBURGH, PA., FORT WORTH, TEXAS, TULSA, OKLA., TORRANCE, CALIF. · MAIN OFFICE: TOLEDO, OHIO

of the original reservoir content is brought to the surface, and that amount produced makes more gallons of gasoline per barrel.

Of Engineering Importance

Deeper drilling is the result of engineering, which has developed improved metals, heavier and sturdier equipment, advanced methods and practices. At the same time experience and greater confidence also have been factors in making such accomplishments possible.

Aside from the economic importance of discovering new reserves, and the honor and publicity connected with drilling to great depths, the actual scientific value of the achievement is of much importance. Each deep test contributes to the advancement of drilling technique to a higher plane. They are to drilling men what the Indianapolis speedway contest is to racing men, the automobile manufacturer and owner. The earlier 10,000-foot tests showed petroleum engineers the problems encountered at such depths, and resulting improvements in drilling practices and machinery have made it easier and safer for others to follow.

Many drilling records have been established in the comparatively short period since the first 10,000-foot test was drilled. Outstanding, of course, is the drilling of the world's record depth test, which reached 12,786 feet. Completion of Humble Oil & Refining Company's Ellender 1, at Houma, Terrebonne Parish, Southern Louisiana, as the deepest commercial producing well in the world, is another outstanding achievement. This well is flowing from 11,620 feet.

A number of strings of casing have been run below 10,000 feet and successfully cemented. The longest string belongs to Humble Oil & Refining Company's Ellender 1, where seven-inch pipe was landed at 12,097 feet. This well also has the honor of performing the deepest perforating job, achieved when casing was perforated at 12,014 feet.

Tabulated History of World's 10,000-Foot Tests

(Data as of June 1, 1937)

Company and Well	Location	Depth	Date	Casing Program	Records Established and Remarks
The Texas Co.'s State Lake Barre 37	Lake Barre, Terrebonne Parish, La. Gulf Coast	10,959	April, 1937	9⅝ @ 8063 ft.	Thirteenth 10,000-ft. test in Louisiana Coast, 31st in world, and sixth for this company.
The Texas Co.'s Rigoletts 5	Lafitte field, Jefferson Parish, La. Gulf Coast	10,942	Jan., 1937	13⅜ @ 1353; 7⅝ @ 10,244 ft.	Completed Jan. 7, 1937 for 1636 barrels choked after plugging back to 10,244 ft. Casing perforated 10,030-10,110 ft. First commercial producer in world below 10,000 ft. Spudded May, 1936.
John I. Moore, Loffland Bros. et al's McDowell 1	Glasscock County, West Texas	10,906	Feb., 1936	15½ @ 237 ft.; 11⅝ @ 2186 ft.; 7⅝ @ 9470 ft.	Flowed 500 bbls. hot sulphur water at bottom. Small oil production for while after acidizing at 10,115 ft. Deepest acidizing job in world.
Union Oil Co.'s Bell 100	Santa Fe Springs, Los Angeles County, Calif.	10,789	April, 1937	8⅝ @ 7427 ft.	Now Fishing.
Shell Pet. Corp.'s Jarnigan 1	Roanoke, Jefferson Davis, Parish, Louisiana Coast	10,750	Sept., 1935	20 @ 64 ft.; 13⅜ @ 3518 ft.; 9⅝ @ 7476 ft.; 7 @ 9772 ft.	
The Texas Co.'s Vermilion Bay 1	Vermilion Bay, Iberia Parish, Louisiana Gulf Coast	10,622	March, 1937		
Penn.-Mex. Fuel Co.'s Jardin 35	Alamo, State of Vera Cruz. Mexico	10,585	Aug., 1931	22 @ 190 ft.; 16 @ 2236 ft.; 13½ @ 2735 ft.; 9⅝ @ 5200 ft.	First 10,000 ft. test drilled outside U.S. Holder of world's depth record for nearly two years.
Humble Oil & Refining Co.'s Thomas 1	Roanoke, Jefferson Davis Parish, Louisiana Coast	10,583	Sept., 1935	16 @ 186 ft.; 10¾ @ 2857 ft.; 7 @ 9619 ft.	Located but one mile from Shell's Jarnigan 1, which was first time two 10,000-ft. tests were drilling simultaneously so close together.
Tide Water Associated Oil Co.'s McGonigle 12	Ventura Ave., Ventura County, Calif.	10,569	Jan., 1937	18 @ 848; 13⅜ @ 6018 ft.; 9 @ 8102 ft.; 5¾ @ 10,077 ft. and 607 ft. of 4 @ 10,566 ft.	Completed Jan. 17, 1937 for 530 bbls. initial. Deepest producing well in world at time.
Shell Pet. Co.'s Stewart 1	Hitchcock Prospect, Galveston County, Tex. Coast	10,460	Oct., 1936	13⅜ @ 2473 ft.; 9⅝ @ 7707 ft.	Texas Gulf Coast first test to reach 10,000 ft.
Harrison & Abercrombie's Bernard River 3	Old Ocean field, Brazoria County, Texas Gulf Coast	10,437	March, 1937	10 @ 40; 13 @ 268 ft.; 9 @ 6070 ft.; 7 @ 10,004 ft.	First 10,000-ft. producer in Texas, fourth in world. Producing from 10,293 ft. Second Texas Gulf Coast test to reach 10,000 ft. and thirty-second in world. Flowing pressure of 3900 lbs.
Union Oil Co.'s Callendar 50	Dominquez field, Los Angeles County, Calif.	10,435	May, 1937	8⅝ @ 6860 ft.; 6⅝ @ 10,050 ft.	
Kettleman North Dome Association's 4-18-J	Kettleman Hills, Calif.	10,400	June, 1937	9⅝ @ 8387 ft.	Still drilling.
Metlal Pet. Co.'s Metlaltoyica 1	Mena, State of Puebla, Mexico	10,400	Dec., 1936		Second 10,000-ft. test in Mexico.
The Texas Co.'s Lafitte 6	Lafitte field, Jefferson Parish, Louisiana Coast	10,368	May, 1937	13⅜ @ 1988 ft.; 7⅝ @ 10,204 ft.	Initialed 1050 bbls. choked at 10,018 ft. Made third 10,000 ft. producer for Lafitte; more than any other field. Also sixth commercial producer from below 10,000 ft. in world.
Superior Oil Producing Co.'s Duplantier 1	Baton Rouge, East Baton Rouge Parish, La. Coast	10,360	Oct., 1935	13⅜ @ 1443 ft.; 9⅝ @ 7744 ft.	
Western Gulf Oil Co.'s Bradley 1	Santa Maria, Santa Barbara County, Calif.	10,296	July, 1932	16 @ 853 ft.; 9 @ 4706 ft.; 5¾ @ 5990 ft.	At the time the deepest in the United States, and second deepest in world.

[*Continued on page 61*]

The deepest core ever taken was in the world's deepest test, Gulf Oil Corporation's McElroy 103, which was cored at 12,786 feet, or on bottom. However, the deepest wire line core ever taken was at 12,165 feet in Ellender 1. A number of electric logging surveys have been successfully made in these deep tests, with Gulf's McElroy 103 having the deepest.

Stanolind Oil & Gas Company's Stovall 1, in Southern Louisiana, drilled with the greatest amount of open. When at 12,128 feet, this test had 10,148 feet of uncased hole. Wells have been successfully acidized below 10,000 feet.

The ability to perform these operations at record depths, where high pressures and temperatures are encountered, and where great strain is placed upon all drilling equipment, is definite assurance that modern equipment is better than it was even a few years ago. This presages many interesting developments in the future. With a richer background of fundamental knowledge than left to earlier engineers, the outlook is for many improvements and changes in both machinery and technique that will permit even deeper drilling. It appears that with proper planning, precautions and machinery, that equipment of today could drill to 15,000 feet, with perhaps a little luck. It is not unwise, therefore, to predict the industry's ability to penetrate 20,000 feet before many years.

A Definite Trend

It was 72 years after Colonel Drake completed his well, before any concern succeeded in drilling to 10,000 feet, but the drilling of such deep tests has become a definite trend in the six years that have followed. Chanslor-Canfield-Midway Oil Company's Hobson A-2, at Rincon, California, was heralded as an outstanding drilling feat in May, 1931, when it stopped at 10,030 feet. This was the first 10,000-foot test in the world. Since that time 47 tests have bored beyond 10,000 feet, six of which have exceeded 11,000 feet and six have gone below 12,000 feet.

The first 11,000-foot test was General Petroleum Corporation's Berry 1, at Belridge, Kern County, California. It went to 11,377 feet, and reached that level in June, 1934. The first 12,000-foot test was Gulf Oil Corporation's 103, in the Gulf-McElroy field of Upton County, West Texas, which did so in May, 1935. With a footage of 12,786 feet, this test still holds the record for deep drilling. However, five other

Tabulated History of World's 10,000-Foot Tests

[*Continued from page 60*]

Company and Well	Location	Depth	Date	Casing Program	Records Established and Remarks
Amerada Pet. Corp.'s Halff & Oppenheimer 8	Pearsall, Frio County, Texas.	10,285	June, 1937	9⅝ @ 6170 ft.	Deepest in South Texas, still drilling June 5.
Humble Oil & Refining Co.'s Continental Fur 1	Castell, Terrebonne Parish, Louisiana Gulf Coast	10,254	Sept., 1936	13⅜ @ 3004 ft.	Third 10,000-ft. test drilled by this concern. Seventh 10,000-ft. hole or deeper for Louisiana.
Kettleman North Dome Assn.'s 56-8-Q	Kettleman Hills, Kern County, Calif.	10,249	June, 1935	20 @ 1200 ft.; 13⅜ @ 6847 ft.; 9⅝ @ 8304 ft.	
Shell Pet. Corp.'s Yturria 1	Willacy County, South Texas.	10,186	June, 1937		Deepest in South Texas Gulf Coast. Still drilling June 5.
Shell Pet. Corp.'s Realty 1	Houma, Terrebonne Parish, Louisiana Gulf Coast	10,157	March, 1936	20 @ 72; 13⅜ @ 2486 ft.	
Pure Oil Co.'s Mallard Bay 1	Cameron Parish, Louisiana	10,146	March, 1937	18⅝ @ 1499 ft.; 13⅜ @ 4604 ft.; 9⅝ @ 7906 ft.	
Denver P. & R. Co.'s Sah-Cam 1	Caddo County, Oklahoma.	10,084	March, 1936	9⅝ @ 7586 ft.; 7⅝ @ 8550 ft.	Third in Oklahoma.
Beaty, Bowles & Borsodie's Truska 1	Algoa, Brazoria County, Texas Gulf Coast	10,083	March, 1937	18⅝ @ 640 ft.; 9 @ 6430 ft.	Thirty-third test to go below 10,000 ft. in world, third in Texas Gulf Coast, eighth in Texas.
Mid-Kansas Oil & Gas Co. (now Ohio Oil Co.) and Ramsey Pet. Co.'s Preston-Culp 6	Cement field, Caddo County, Oklahoma	10,079	Oct., 1931	12½ @ 64 ft.; 9 @ 5515 ft.; 6⅝ @ 9777 ft.	First 10,000-ft. test east of Rocky Mountains. Record depth casing string at time. Second 10,000 ft. test in world.
Arkelo Pet. Co.'s Arkelo 1	Laredo area, Kern County, Calif.	10,056	April, 1937	13⅜ @ 726 ft.	Now fishing.
Humble Oil & Refining Co.'s Nordyke 1	Ebenezer Prospect, Acadia Parish, La. Gulf Coast	10,056	April, 1937	20 @ 152 ft.; 13⅜ @ 2130 ft.; 9⅝ @ 6850 ft.	
Amerado Pet. Corp.'s Halff and Oppenheimer 2	Pearsall, Frio County, South Texas	10,050	Nov., 1934	15½ @ 289 ft.; 9⅝ @ 4952 ft.	Texas' first 10,000 ft. test. Plugged back 3925 ft. and opened Pearsall field.
The Texas Co.'s Bateman Lake 1	St. Mary Parish, South Louisiana	10,048	June, 1937		Still drilling.
The Texas Co.'s Milling 1	Lafitte field, Jefferson Parish, La. Gulf Coast	10,040	Jan., 1937	13⅜ @ 1937 ft.; 7⅝ @ 10,040 ft.	Completed Jan. 13, 1937 for 1550 bbls. choked. Second 10,000 ft. commercial well in world and second at Lafitte.
Chanslor-Canfield-Midway Oil Co.'s Hobson A-2	Rincon, Ventura County, Calif.	10,030	May, 1931	18⅝ @ 795 ft.; 11¾ @ 4326 ft.; 8⅝ @ 6640 ft.; 5⅝ @ 7479 ft.; 4 in. liner 8126 ft.	First test ever drilled to 10,000 ft.
Anglo Iranian Oil Co.'s Pirgah 2	Zeloi, Iran	10,026	April, 1936	6¼ @ 8022 ft.	First 10,000 ft. test east of Suez. Reached depth in 10 months.
The Texas Co.'s K. C. L. C-11-49	Kern County, Calif.	10,014	Oct., 1936	13⅜ @ 900; 9⅝ @ 8069 ft.	
Superior Oil Prod. Co. and Pure Oil Co.'s Martinez 1	Bosco, St. Landry Parish, Louisiana Gulf Coast	10,002	Jan., 1935	13⅜ @ 226 ft., 7 @ 9325 ft.	First 10,000 ft. test in Louisiana.

tests, four in the Louisiana Gulf Coast district, have reached 12,000 feet.

While the above figures indicate the trend toward deeper drilling, they do not show the true picture of the rapid increase recently. Although only five months of 1937 have passed, approximately half of all the 10,000-foot holes have been active during this time. In 1931, the first year, three 10,000-foot tests were drilled, one was in 1932, four in 1934, seven in 1935, 10 in 1936, and 22 so far in 1937. Thus, there has been a steady increase in the number of tests drilled to 10,000 feet each year since 1934, until 1937 when a sharp upward curve took place. Thirty-two, or well over half of the total number have occurred in the last 17 months, and 10,000-foot holes have become common today. Even 12,000-foot holes do not cause the excitement a 10,000-foot one did a few years ago. In the last six months, there have been five tests that have reached 12,000 feet.

Louisiana Coast Leads

Although the first 10,000-foot test in the Louisiana Gulf Coast was not drilled until 1935, it leads in the number of such tests today. A total of 18 wells have gone beyond 10,000 feet in this district, of which four have surpassed 12,000 feet. During 1935, 1936 and 1937 (first five months), when Louisiana operators were drilling 18 deep tests, the remainder of the world was drilling but 21. However, in the five months of 1937, South Louisiana has had 11 of the 22 tests.

California ranks second to Southern Louisiana, having 12 tests that reached 10,000 feet. Texas is third with 10.

Drilling Depth Records

	Feet
Greatest Depth:	
Gulf Oil Corporation's McElroy 103, Gulf-McElroy field, Upton County, West Texas	12,786
Longest Casing:	
Humble Oil & Refining Company's Ellender 1, Houma, Terrebonne Parish, Louisiana Coast, set 7-inch pipe at	12,097
Other Casing Records:	
9⅝-inch pipe set in Humble Oil & Refining Company's Ellender 1 at	8,735
7⅝-inch pipe set in The Texas Company's Horshoe Bayou 1, St. Mary Parish, Louisiana Gulf Coast district at	10,975
7-inch (See "Longest Casing" above).	
6⅝-inch pipe set in Union Oil Company's Lillis-Welsh 1, Kettleman Hills, Kern County, California, at	10,813
5-inch pipe set in Continental Oil Company's Hebert 1, Vermilion Parish, Louisiana Gulf Coast, at	11,795
Greatest Amount Open Hole:	
Stanolind Oil & Gas Company's Stovall 1, Vermilion Parish, Louisiana, at 12,128 feet had open hole amounting to	10,148
Deepest Perforating Job:	
Humble Oil & Refining Company's Ellender 1, Terrebonne Parish, Louisiana, shot casing at	12,014
Deepest Coring Job:	
Gulf Oil Corporation's McElroy 103, Gulf-McElroy field, Upton County, West Texas	12,786
Humble Oil & Refining Company's Ellender 1, Terrebonne Parish, Louisiana, took deepest wire line core at	12,165
Deepest Acidizing Job:	
John I. Moore, Loffland Bros. et al's McDowell 1, Glasscock County, West Texas, at	10,115
Deepest Electric Log:	
Gulf Oil Corporation's McElroy 103, Gulf-McElroy field, Upton County, West Texas, at	12,786

Companies Drilling More than Two Tests Below 10,000 Feet

COMPANY	Number 12,000 Foot Tests	Number 11,000 Foot Tests	Number 10,000 Foot Tests	Total All Below 10,000 Feet
The Texas Company	1	0	7	8
Humble Oil & Refining Company	1	1	3	5
Union Oil Company*	½	1	2	3½
Shell Petroleum Corporation	0	0	4	4
Continental Oil Company	1	1	0	2
Superior Oil Co.†	½	0	1½	2
Gulf Oil Corporation‡	1	0	1	2
Amerada Petroleum Corporation	0	0	2	2
Denver P. & R. Company	0	1	1	2
Kettleman North Dome Association	0	0	2	2
Pure Oil Company	0	0	1½	1½
Totals by Eleven Companies	5	4	25	34

* Superior Oil Company jointly operated one test with Union Oil Company. Moreover, Union Oil Company took over another test after it had reached 10,944 feet.

† Includes operations of Superior Oil Producing Company, a direct subsidiary. Superior Oil Producing Company and Pure Oil Company each drilled one test, and jointly operated the other.

‡ Includes Western Gulf, a subsidiary.

United States in Front

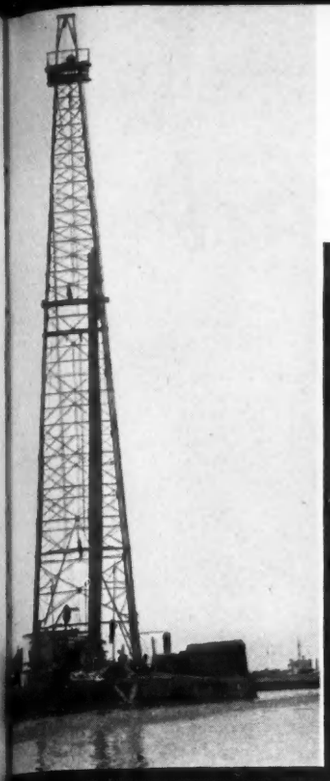
Of the 47 tests drilled beyond 10,000 feet, all but four have been within the borders of the United States. There have been two in Mexico, and one each in Roumania and Iran. The Roumanian test is the deepest outside of the United States, having reached 11,092 feet.

In the United States, the Gulf Coast district of Louisiana and Texas has accounted for 22 of the tests, or half of all those drilled in the world.

It is natural that these three regions should lead in deep drilling, for geologists tell us that they are the most favorably located for production at these depths. It has been predicted that the basement in the Gulf Coast may not be reached before 28,000 feet.

Seven Companies Lead

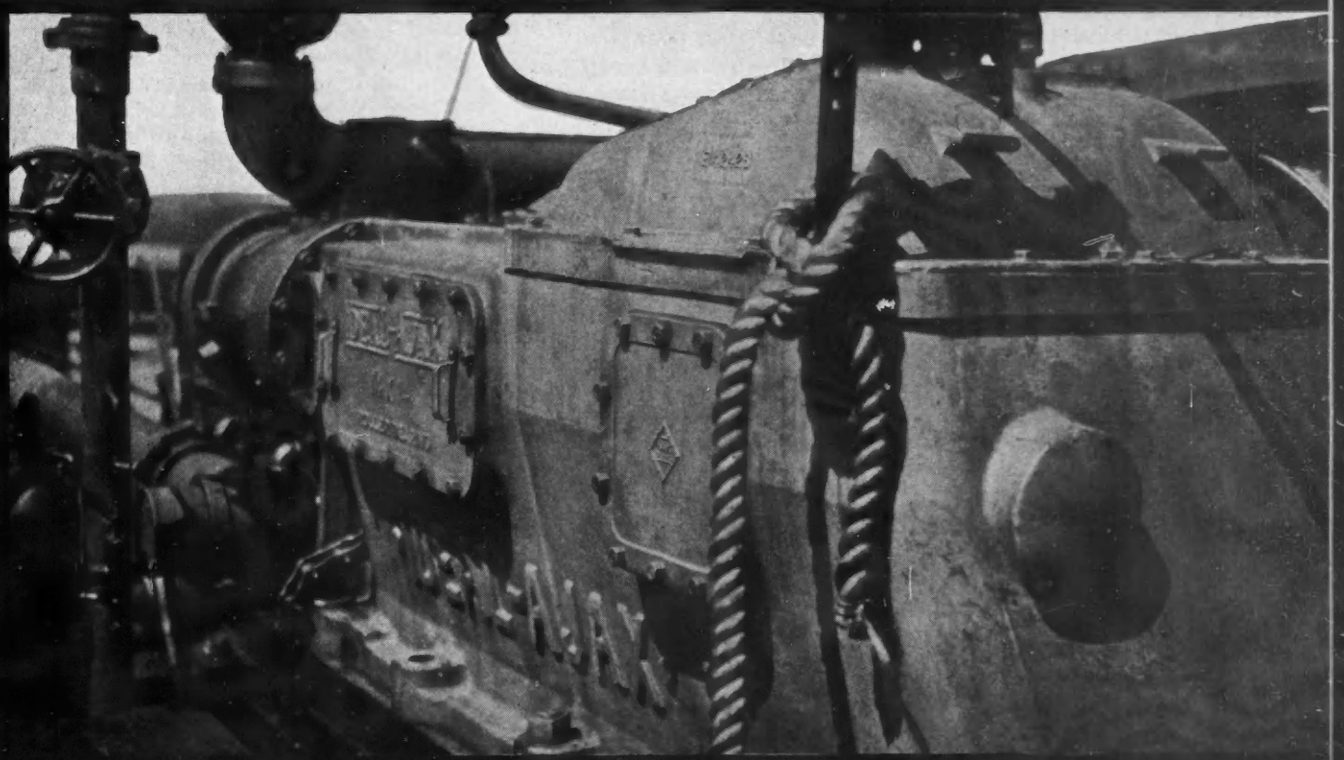
It is interesting that more than half of the 10,000-foot tests have been drilled by 11 companies. They have accounted for 34 of the 47 tests. The Texas Company is the "champion" driller of deep tests, having carried eight to that level. One of the company's operations reached 12,261 feet, and is the second deepest in the world. Humble Oil & Refining Company ranks second to The Texas Company, accounting for five of the operations. Only 11 companies, so far, have participated in the drilling of more than one 10,000-foot test.



Horseshoe Bayou No. 1, on Horseshoe Bayou, St. Mary's Parish, Southern Louisiana. Spudded in September 4, 1936. The longest string of 7⅝" casing ever set,—11,769 feet. Derrick is set on matting.

On its way to 13,000 FEET

AND A NEW WORLD'S RECORD



AJAX ENGINES

Manufactured Exclusively by

AJAX IRON WORKS
CORRY, PENNSYLVANIA

Distributed by

THE NATIONAL SUPPLY COMPANIES IN EVERY FIELD

Coring Increased and Improved Past Year

By EARL S. POST, Staff Writer

NECESSITY for more certain subsurface information in which the true characteristics of each formation can be definitely determined has brought rise to probably the greatest coring or logging study on the part of the engineers and scientists in the history of the oil industry. The result, still far from absolute perfection, has been most encouraging during the past few years.

Many new devices and methods for studying the lower beds of the earth have been brought to light. The advancement has been so great that a number of condemned wildcat prospects have been redrilled with productive success. In some cases, replacement holes to wildcat failures have been completed as oil wells.

The fact remains that regardless of how much work is done from a geological and geophysical standpoint, working up "picture book" types of structures, new fields are seldom found unless information in the drill hole is adequately checked. Likewise, development of already proven properties must follow a similar plan of accurate information.

Subsurface investigations now go much farther than the early days of merely checking the cuttings and attempting to guess at just what the formation was in place. Coring laboratory analysis, temperature determinations, bottom-hole pressure tests, electric formation logging devices, instruments for determining points of water intrusion into casing, formation logging devices to be used inside of the casing, etc, have taken an important place in the development of the industry.

A complete description of these slight advancements is next to impossible, due to their large number and the variances of individual pieces of equipment.

Methods of Coring Change

The methods of coring have shown material changes, the trend being toward cutting full sections of hundreds of feet of formation with the largest possible cores. This work is being done for the benefit of the geological and engineering departments of the oil companies for present exploration and development, and for studies for future production.

From a mechanical standpoint, much work has been done on building of hardened core heads and bits to withstand the tremendous wear through continuous cutting of both hard and soft formations. Engineers have been unusually busy on developing dozens of types and sizes of bits to be used on barrels of all makes and descriptions. Likewise, considerable work has been done in working out newer and more adequate core catchers, especially for the purpose of holding soft sands and other formations incapable of recovery except through the use of delicate catchers. A number of other intricate parts of the tool have been developed in an effort to make core drilling a less hazardous task.

The core barrels and systems of operation have undergone the most important changes. Two types of core drilling are now being resorted to, namely continuous and single cores. The former has undergone considerable change in method, while the latter has seen its main advancement in continued development of metals used in its fabrication, enlargement of size of core chamber and in its adequacy to recover a greater percentage of cores attempted. This particular type barrel, which has proved highly efficient from a recovery standpoint, is operated by pulling the entire string of drill pipe and rerunning it for the next core.

The continuous core drilling method, effected through the use of core tubes run into the inside of the drill pipe and recovered by wire lines or reverse circulation. The tube, run through the pipe to a seat at the head of the core bit, is kept in place by various types of fastenings or through pressure. When the core is completed, the tube is fished out or pumped out and the same tube or another put back into the hole for the next core.

The retractable core tubes have given rise to further development of internal flush joint drill pipe or other drilling tubular goods which will enable the use of the largest possible tube; this in turn enabling the largest diameter of core recovery. As readily can be seen, the continued change in core drilling has affected virtually the entire set-up of rig design.

A method being employed in the majority of field wells is to core the entire section from considerably above the producing zone to the bottom of the hole. The main purpose of this work is to determine any stray lenses of sands above the producing zone, also to enable the selection of the best possible casing seat.

Continuous core drilling has shown such an advancement during the last several years that many companies are resorting to sampling full holes from near top to bottom. One company is at this time drilling an 11,000-foot wildcat and had cored it solidly from around 5000 feet. Several similar cases have seen 3000 to 7000 feet of core taken from single wells. On the 11,000-foot project, 3-inch drill pipe is being used and small diameter hole drilled. It is entirely an exploratory project, which if found to be productive will be tested only after the hole has been reamed to sufficient size to set a string of casing.

Core Data Important

The core drilling of these wildcats has a great importance on the future of exploration. Many wells, despite their careful drilling, obviously have passed up

CHESTER High Tensile Steel Casing

has a **BRINNELL** *hardness of 140 Minimum*

The Brinnell test is but part of the extensive and rigid examination to which Chester High Tensile Steel Casing must be subjected before it leaves the plant.

Because of these exact tests—and because of the successful performance of thousands of *strings* now in use—we can assure prospective users that Chester casing will stand up to the toughest service. We can promise new freedom from damaged threads in handling—and an almost complete elimination of burnt thread in making up.

When you specify Chester High Tensile Steel Casing, you can expect a steel casing that will fill *all* your requirements — with room to spare.

South Chester Tube Co.
Chester, Pa.

District Sales Managers

W. E. Gibson, 1331 Gulf Bldg., Pittsburgh, Pa.
J. P. Cooney, 715-716 A. G. Bartlett Bldg., Los Angeles, Calif.
J. P. Steele, Petroleum Bldg., Fort Worth, Texas.

District Offices

South Chester Tube Co., 1708 Hudson Terminal Bldg., 30 Church St., New York, N. Y.
J. D. Swartz, Beacon Bldg., Tulsa, Oklahoma.
E. L. Moseley, 2218 Mills St., Houston, Texas.

District Warehouses

Houston, Tex.; Thenard, Cal.; San Francisco, Cal.

Distributors

Western Supply Co., Tulsa, Okla., and Branches.
International Supply Co., Tulsa, Okla., and Branches.
Dunigan Tool & Supply Co., Breckenridge, Texas, and Branches.
Bridgeport Machine Co., Wichita, Kansas, and Branches.
Louisiana Supply Co., Sulphur and Brimstone, La.
Oil Field Equipment Co., San Antonio, Texas.
Industrial Supply Company, Inc., Wichita Falls, Texas, and Branches.
Okmulgee Supply Corp., Okmulgee, Okla., and Branches.
Stephen M. McCabe, 508 4th St., San Francisco, Calif.
Viking Automatic Sprinkler Co., 114 Sansome St., San Francisco, Calif.
Herley Supply Co., 3006 Cherry Ave., Long Beach, Calif.
Barde Steel Co., Seattle, Wash., and Portland, Ore.
Star Drilling Machine Co., 550 Clinton St., Portland, Ore., and Akron, Ohio.
The Atha Supply Co., Zanesville, Ohio, and Mt. Pleasant, Mich.
United Pipe & Supply Corp., Charleston, W. Va., and Branches.
Kane Supply Co., Kane, Pa., and Branches.
Prichard Supply Co., Mannington, W. Va., and Branches.

CHESTER
STEEL CASING

possible oil and gas sands, or have failed to find key markers at the depths they should have been found. Heavy muds, fast drilling, etc., frequently give entirely different impressions of formation conditions, thus reducing the value of mere well sampling in areas where tremendous drilling speed is possible. In solidly coring these prospects, however, it is possible to gain virtually complete information of the formation.

From an information standpoint, these solidly cored holes in wildcats are of tremendous importance in studying the areas. The geologist is able to check core by core and find true variance of sand conditions, position of various fossils, etc.

On a certain wildcat recently, coring had been ordered to be commenced at approximately 5700 feet. Changing of fish tail bit was required at 5650 feet. Instead of going into the hole with the regular fish tail bit, it was decided to put on the continuous coring equipment and make the several long cores above the ordered depth. A most unusual thing happened; a full section of sand was brought to the surface and a new producing horizon opened in the field which this well was attempting to extend.

Extend Laboratory Work

The trend toward larger cores is explained in several manners. Considerable work is being done in an effort to study the permeability, porosity, saturation, etc., of sands and other producing formations, thus determining the reserves of oil properties. Through properly coring at least key wells of the field, adequate samples are available to the laboratory for its studies.

This particular type of laboratory work is by no means new in the districts producing Pennsylvanian type crudes. The purpose of these studies mainly is to determine the adaptibility of the various sands to secondary recovery, either by water flooding or repressuring.

The trend during the past several years has been for similar studies in the upper Mid-Continent, Gulf Coast and in the California districts, partly for secondary recovery studies. In the Coastal sector, mainly Texas and Louisiana, this work has been done largely for the purpose of determining the proper casing points, locations for later casing perforating levels, etc. It has been found that the laboratory studies of cores is highly valuable to the geologist and engineer in determining the method of well completion. Encroachment of water, gas/oil ratio, etc., have been controlled in a great part as a result of this work.

Another sidelight on the making of cores, especially large cores, is the determination of formation drift or dip. The bade of faulting and its direction, likewise, is determined through the use of such core information. The advancement of photo method of exploration in drill holes, orientation, and other surveys, systems which appear almost uncanny, definitely determine the inhole picture when supplemented by well cut, adequate cores.

In a number of cases wherein the cores have shown conditions indicating faulting, surveys of the hole, plus correlations of other drill holes line out the trend of structure sufficiently to materially reduce hazards of drilling failures.

Such core information proves of unusual value. In some cases, it has been found that wells are drilled within a short distance of the producing zone and that by drifting the hole a few feet with special type of directional equipment, oil producers will result. A case is shown in Figure 1.

Too much cannot be said of the value of good cores. Whether it be in the areas where stray sands abound, or whether it is in a district in which single producing horizons are sought, these cores are of infinite value in studying the general zone.

So much is the above a fact, that the Gulf Coast plain of Texas and Louisiana is in the throes of a most important core drilling campaign. In controlled blocks, wherein companies are in possession of vast potential reserves, numerous deep wells, 9000 to 12,000 feet are being sunk and cored almost solidly to obtain the true cross section of the territory.

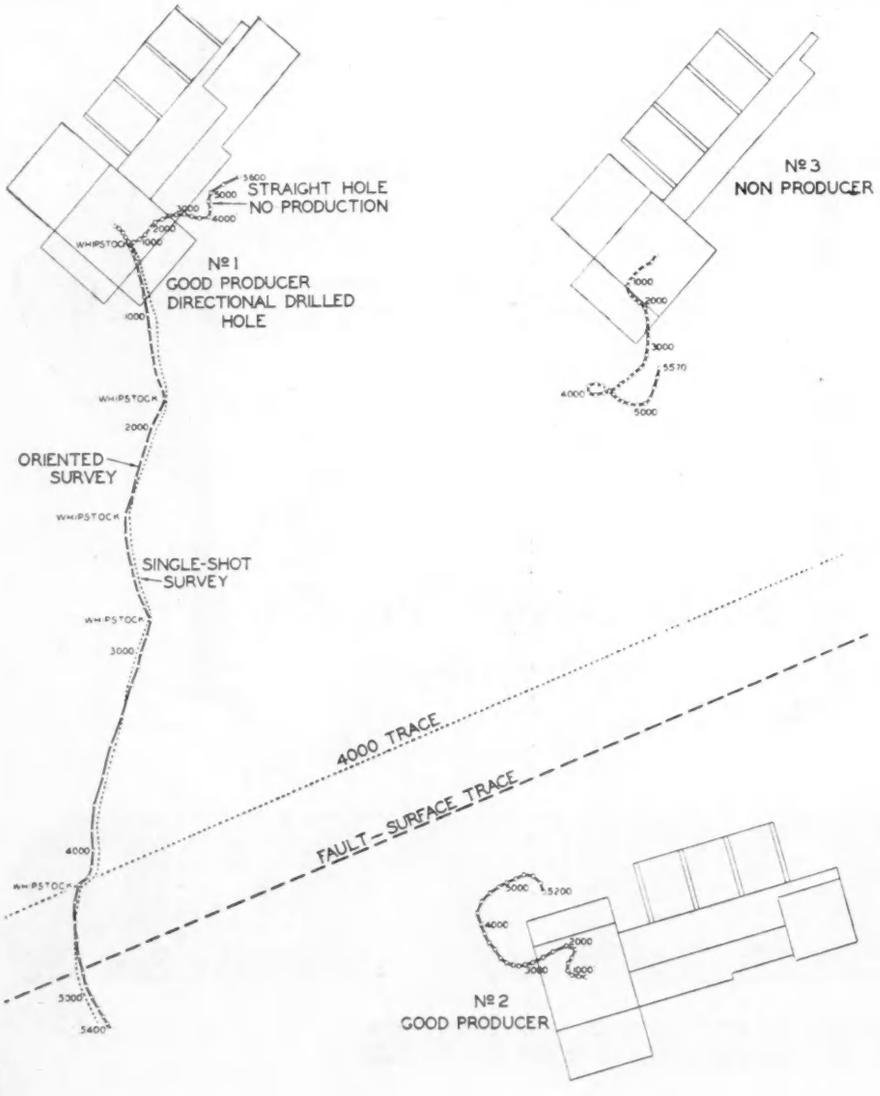
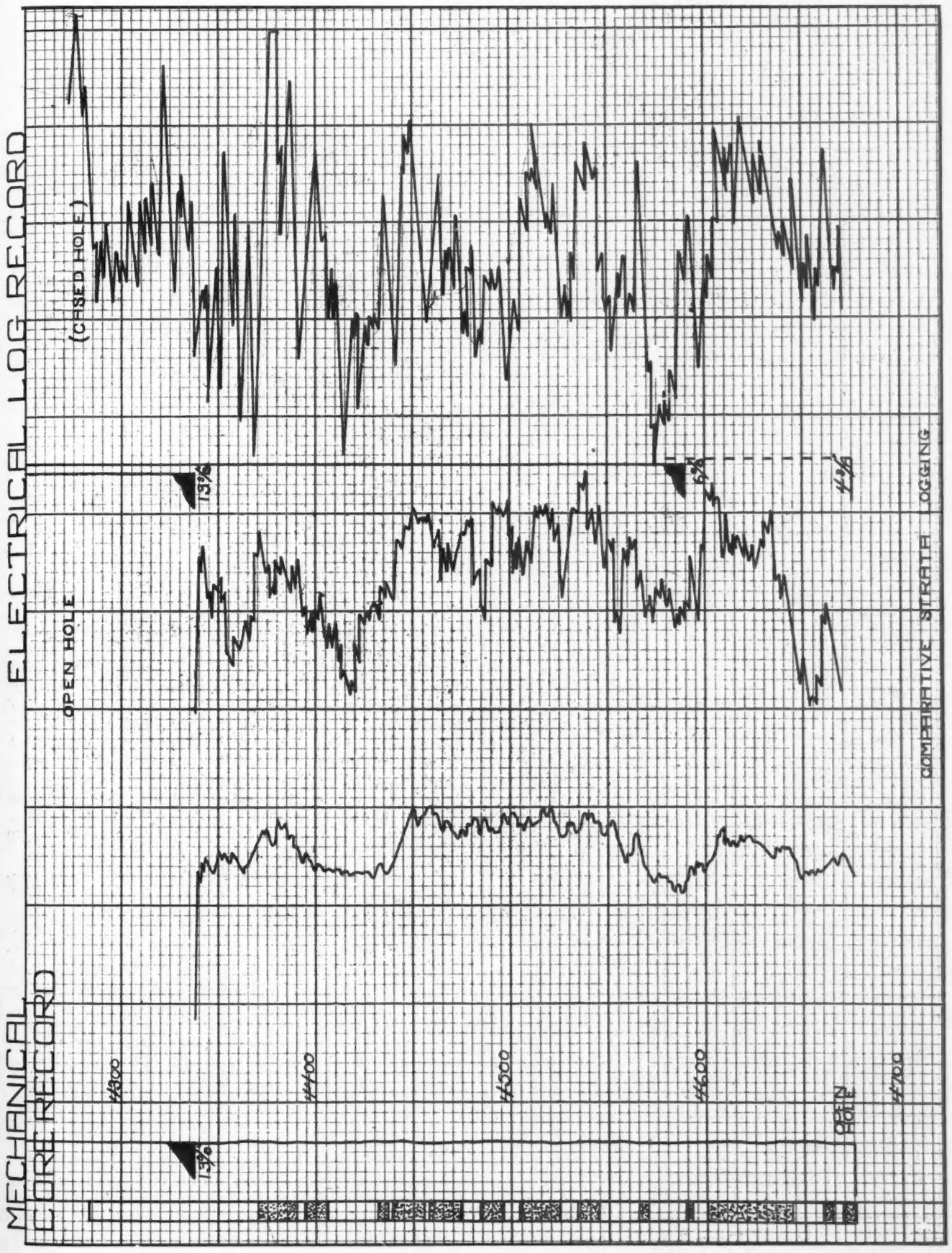


FIGURE 1

One particular field is an excellent example of just how a district should not be developed. Discovered ten years ago, this coastal area was operated in a supposedly sensible manner. Test wells, offsetting each other, were pumped down in as rapid a time as possible with casing being landed to the apparently most logical level. The wells were large and the recovery was profitable. Today, however, this field is attempting to work over,

FIGURE 2



complete in other producing levels known to the field, etc. To pictures are brought to light in the way of unheard of sands, production in apparently dry spots, and other such passed up profit.

Such unfortunate happenings in many of the fields, especially coastal areas, made another type of subsurface investigation necessary; to find possible oil or gas producing sands behind already cased holes. This equipment was designed and first successfully used in California fields, where hundreds of tests were made in a successful manner. In determining possible oil sands and shales, it was found that the number of strings of pipe in the hole, length of time the casing had been set or the drift of the hole had no particular bearing on its operation. The electric-chemical method is based on electro-motive force of metals, using the casing as the main element and building the balance of the circuits around it. It logs the sands and shales in a similiar manner to other electric types of coring devices, thus the logging of at least key wells in a field through this method gives improved information for correlation purposes.

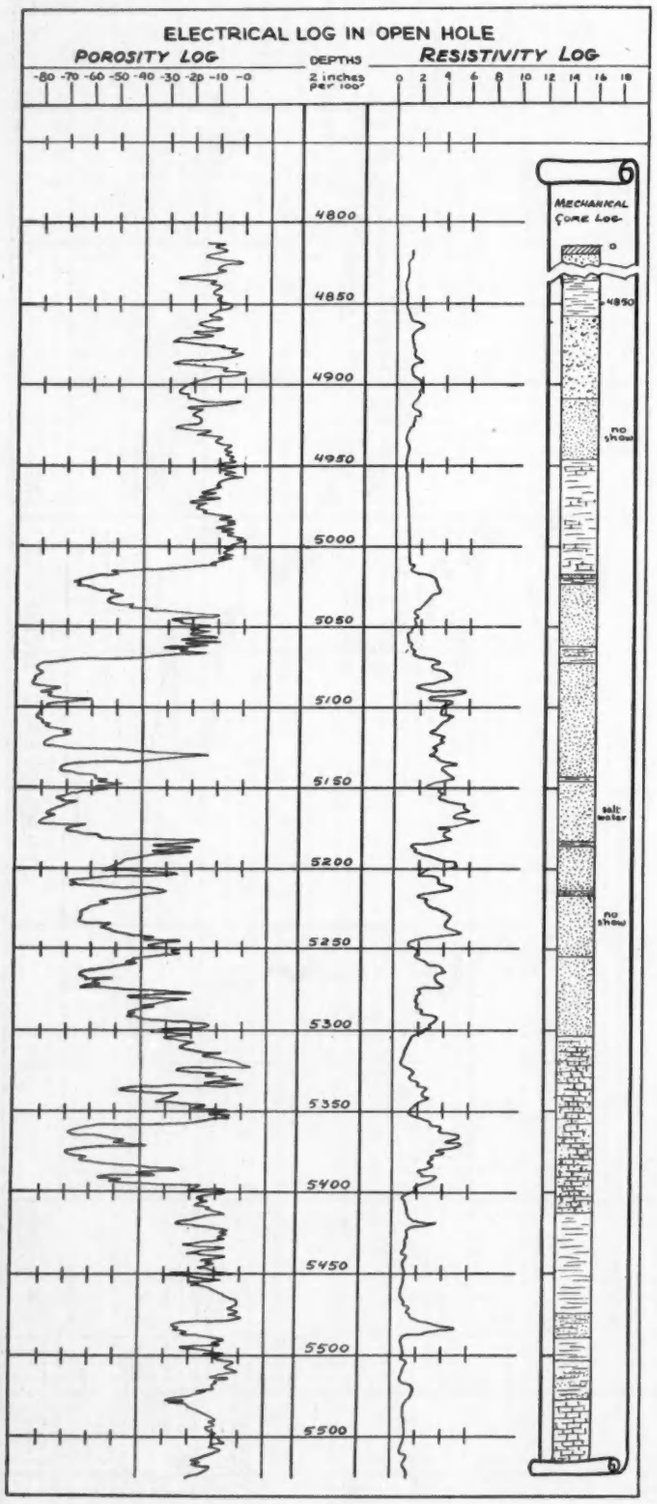


Figure 3

Similiar methods to the above are used in working over of wells showing water. Either leaky casing or intrusion of water in the oil or gas bearing formation gives rise to the loss of much production profit unless controlled. Electrical testing equipment is put into use in definitely determining the entry of this undesired fluid, thus enabling its final and complete shut off.

Another instrument uses photo electric cell as means of determining the point at which the water enters an open hole. A slot in a piston allows fluid contained in the fluid head to travel through an orifice. This orifice, or slot, is near the side of the device, which is lowered through the fluid column. A light on one side of the orifice sends rays through the fluid, this actuating the photo electric cell. Of course, the amount of light traveling through the fluid is dependent upon the degree of clearity of water and is maximum at the point of water entrance.

Several types of electrical logging methods have been developed during the past several years to be used in the open hole.

In Figure 2 a comparison of findings several of these types of electrical logging devices is shown. Figure 3 shows a section of well cored hole in a South Texas Coast well, compared to a corresponding section of an electric formation test run in an uncased hole.

A trend during the past several years, probably a direct result of the proration and improved methods of production, is the determination of possible reserves in discovered reservoirs. At the time of this writing one South Texas well is drilling and coring ahead after finding 20 feet of excellent sand capable of providing a good commercial producer. The well has been cored almost solidly from a very shallow depth and will continue such exploration on to its 7000-foot contract level. It will continue to make drill stem tests of its various sands, it will have laboratory analysis made of samples, it will run an electric logging device upon reaching its desired depth, then will set casing, plug back and perforate likely producing sands. The single project will uncover a rather definite value as to the reserve.

Knowing sand conditions in the general area, comparing those with the horizons found in the above wildcat, plus the geological and geophysical structure mapped, it will be possible for engineers and others involved in the planning of the field's development to definitely set up rules for the proper handling. Such planned programs should greatly aid in recovering the largest amount of crude at a minimum cost.

This new trend of exploration, therefore, may have three bearings on the economic situation. Definite subsurface study, thus determining possible recoverable reserves, make them available for market demand as needed. At the same time, tremendous sums of money now unnecessarily spent in some types of exploration may be saved.

The third, one of the most important, is conservation of natural reserves. Properly explored fields, in which spacing, completion methods, etc., are controlled, will recover far more oil with less gas wastage and reduced water intrusion.

The very nature of the fabrication of Wisscolay Preformed Wire Rope automatically equalizes the lengths of the various strands. There are, therefore, no long drones nor short units that fail from overwork before their time. Every wire and strand assumes its equal share of the load. The resulting longer life of Preformed Wire Rope makes it a most economical rope. Practically all constructions can be made in Preformed. Tell us your use of wire rope and we will gladly recommend the best Wisscolay Preformed for your purpose.

WICKWIRE SPENCER STEEL COMPANY, *General Offices:* 41 East 42nd Street, New York. *Sales Offices and Warehouses:* Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles; *Export Sales Dept.:* New York. WICKWIRE SPENCER SALES CORPORATION, New York, Chattanooga, Tulsa, Portland, Seattle.

WIRE ROPE
by Wickwire Spencer

WICKWIRE SPENCER STEEL COMPANY
41 East 42nd Street, New York City

Please send me my free copy of your popular, new money saving manual, "Know Your Ropes."

Name_____

Firm_____

Address_____

City_____ State_____

OW

Exploration By The Reflection Seismograph

IN THE GULF COAST OF TEXAS AND LOUISIANA

By E. E. ROSAIRE, President
Independent Exploration Company

GEOPHYSICAL methods of exploration were first proved of commercial importance, in the United States at least, in the Gulf Coast in 1923 and 1924. Since that time, this region has been one of the most important proving grounds for geophysical methods of exploration for petroleum. In spite of the successful introduction of geophysical methods of exploration into other petroleum-producing provinces, and the consequent distribution of geophysical laboratories and shops, the volume of geophysical exploration and research is greater in the Gulf Coast than in any other petroleum-producing province. Obviously, an inspection of the reflection seismograph, as operated in this territory, should be of more than passing importance.

Historical

This method, as initiated and developed into a field-worthy mode of exploration, by the Geophysical Research Corporation, was first tried out in the Gulf Coast in 1926, perfected in Oklahoma during 1927 and 1928, and then re-introduced into the Gulf Coasts of Texas and Louisiana in 1929 and 1930. In this re-introduction,[1] the initial attempt to use the same methods of correlation of reflections from shot point to shot point, as developed and successfully used in Oklahoma, was tried and discarded because of the apparent absence of obviously correlatable reflections. Shortly thereafter, however, in a reflection seismograph survey of the marginal prospect, indicated by the torsion balance and refraction seismograph prospect near Darrow, La., the idea of mapping subsurface structure, by the buried dips shown by the step-outs of the reflection on the individual traces, was conceived and immediately developed into a practical field method[2].

The introduction and growth of this method are shown chronologically in Figure 1, together with the corresponding activities in torsion balance and refraction seismograph exploration, as well as an index of the price of oil. In 1929 and 1930 exploration was reduced to a minimum in this province. Although this decrease of exploration was primarily due to the rather general recognition that the two standard exploration methods, the torsion balance and refraction seismograph, were yielding only marginal and sub-marginal prospects, the practical cessation resulted from a flood of low-priced petroleum from the vast East Texas oil-field. In late 1930 and 1931, however, the recognition of Conroe as a major oil-field initiated a definite immigration of Mid-Continent oil operators into this territory. Since they were well acquainted with the excellent performance of the reflection seismograph method in the Mid-Continent, as used by the Geophysical Research Corporation, these operators were quite willing to use the reflection seismograph in the exploration of the Gulf Coast. Some of the local operators, such as Humble Oil & Refining Company, had also initiated reflection seismograph exploration in this area for their own account. It is interesting also to note how the increased activity in exploration by the reflection seismograph in this area coincides with the increase in the price of oil from 1930 to 1932[3].

Since most prospectors like to have some definite excuse for drilling a wildcat well, the use of the reflection seismograph to examine old prospects was the natural procedure. However, the finding power of the reflection seismograph was utilized to best advantage by those operators who made use of this method to evaluate marginal prospects previously indicated by the torsion balance. An outstanding example of the rewards following such tactics was the string of three consecutive hits scored by Stanolind Oil and Gas Company in 1934 and 1935 (Hastings, Brazoria County, Texas; South Houston, Harris County, Texas; and Turtle Bay, Chambers County, Texas).

The general recognition of that principle led to the last stage of exploration by the torsion balance, in the form of a race by the major operators in this area to be the first to complete their networks of torsion balance stations. At present, practically all torsion balance activity in this area is carried on by company-owned crews making blanket exploration.

The Present Situation

In March 1935 the prediction was made[4] that the major operators of reflection seismograph exploration parties in this province soon would have so much reflection seismograph data on individual prospects that they would, naturally start tying these prospects together in order to secure blanket coverage. At present, an appreciable part of the exploration by the reflection

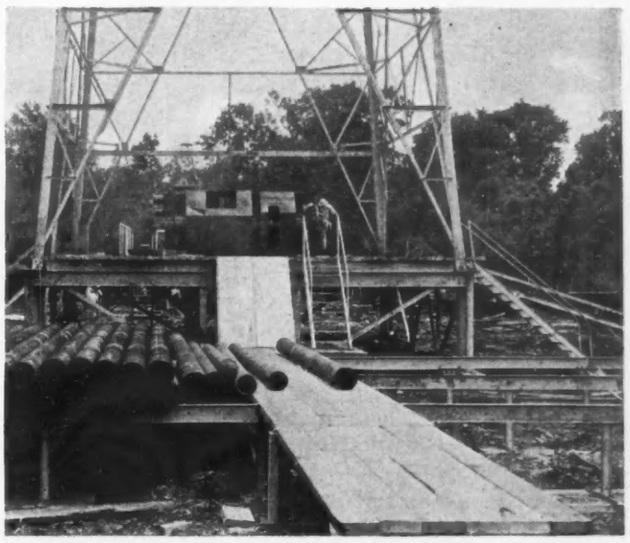
Reprinted from the Journal of the Institution of Petroleum Technologists, London, England.

TRIED BY THE GREATEST JUDGE OF ALL...TIME

TIME, the infallible judge, has placed the stamp of approval on Parkersburg Heavy Duty Drilling Equipment. In field after field and year after year it has delivered the goods under every conceivable operating condition and on every type of location. In all its history no job has been tough enough to set a limit to its endurance.

Operators who have used Parkersburg Heavy Duty Drilling Equipment will tell you that there is nothing unusual in its exceptional performance . . . they know that it was designed to do an outstanding job. It reflects in every detail the experience gained in over forty years of manufacturing oil field equipment . . . plus the highest type of fabrication that modern equipment and methods can achieve.

There's a Parkersburg representative in your field who will be glad to give you full details on your requirements . . . call him today, before your next location is due. He'll be glad to tell you why so many operators consider it both wise and profitable to depend on Parkersburg quality and service.



THE PARKERSBURG RIG & REEL CO.
PARKERSBURG, W. VA.
Branches in All Active Fields

PARKERSBURG
Derricks and Substructures

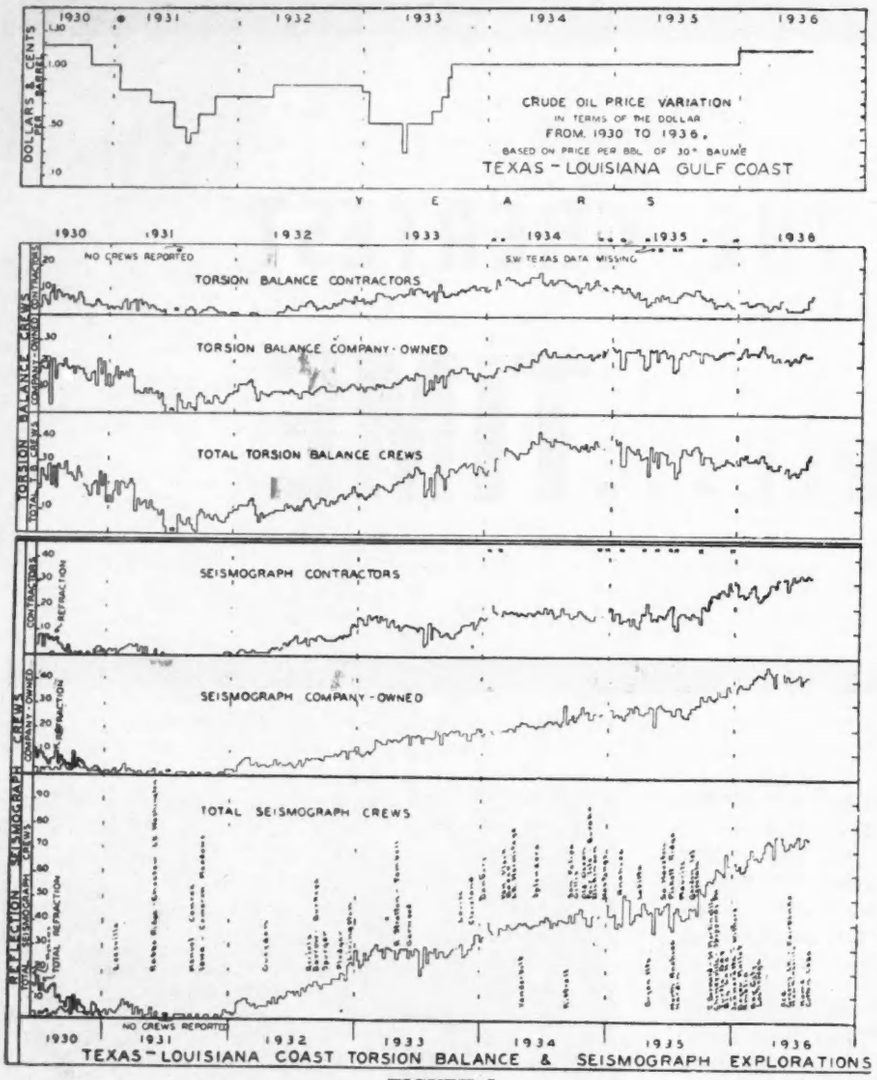


FIGURE 1

seismograph in the Gulf Coast has assumed that form, for more and more operators are neglecting to look for prospects to explore, and are turning to the blanket exploration of township after township by the reflection seismograph.

From the use of such tactics at least three important conclusions can be reached, as follows:

(*a*) The law of diminishing returns has run its course for all methods of finding power less than that of the reflection seismograph, so that there is less and less justification for exploration by any method available but the reflection seismograph.*

(*b*) Additional exploration by the reflection seismograph is justified only for those operators who have accumulated appreciable areal surveys by this method, and who thus have a material patchwork upon which to make a blanket exploration.

(*c*) Smaller operators, who do not have this prerequisite patchwork are not justified in exploration or prospecting in this area until a method of still higher finding power is made available.

As is usually the case, the prospects being turned up by this blanket exploration are, quite generally, the less obvious ones, and ones which, from the standpoint of relative relief, would have been considered as marginal two or three years ago. While some of these less obvious prospects have been indicated as potential oil fields of importance by development, the greater number have been found disappointing upon development, indicating relatively small accumulations of oil, or, even worse, no commercial production even after several wells have been drilled.

The failure to find oil on these structures of low relief may not be conclusive, because of the faulting, often quite complicated, associated with each Gulf Coast structure. Since good correlations in this area are more nearly the exception than the rule, analyses of these fault systems by using the reflection seismograph are expensive, tedious, and often unreliable. Since the disinclination to continue development until production is established increases progressively with the number of dry holes drilled on a prospect, the woods are full of geophysical prospects apparently condemned by one, two, or even three dry holes, while the search for virgin prospects continues unabated. If a method of higher finding power is made available, then these, tested and so far dry, structures will, of course, be the first-class prospects of another new era.

Although the method under discussion is no longer the bright and shining example that it was in 1934 and 1935, a review of the development which resulted from the use of the reflection seismograph, as well as the developments in the method itself, should be important as well as interesting.

Developments Resulting from the Use of the Method

At the time that the method was first introduced, there were prevalent several misconceptions regarding the subsurface situation which have since been dispelled in accordance with confirmations of the predictions which followed the use of the reflection seismograph. Thus, in 1930, the sedimentary structure around a salt dome was generally supposed to be much like the wood fibres near a nail driven through a plank; faulting, though reported occasionally in the literature, was regarded as unusual, and certainly not regional; the sedimentary structure of the Gulf Coast was assumed to be a heterogeneous accumulation of lensing sands and shales; the subsurface structure of known fields like Orange, Goose Creek and Welsh was unknown, and the possibilities of production from structures like the

*In his presidential address before the Society of Petroleum Geophysicists, March 24, 1933, Houston, Texas (*Trans. Soc. Petr. Geophysicists,* 1933, **4**, 3-12), Paul Weaver used the term "resolving power" to indicate the theoretical difficulty of obtaining information by the "potential function methods" of geophysical exploration (gravitational, magnetic and electrical methods). There has been an extension of the use of the term "resolving power" to all methods to indicate the "ability to make obvious" the remaining undiscovered oil-fields. In a recent conversation with the writer, Dr. L. W. Blau, of Humble Oil & Refining Company, Houston, Texas, suggested that the term "finding power" would be more descriptive and proper, and so the "finding power" of a method is used in this article to indicate the "ability to make obvious oil deposits as yet unproved by the drill."

STAMINA

Fig. 1740 Gaso Duplex Piston Timken Bearing Power Pump, 54 to 250 Bbls.

• Many a fighter looks good during the first few moments of the battle . . . but it takes a real champ to stand up round after round under the grind of grueling punishment. Therein lies the secret of Gaso's championship . . . Gaso Pump & Burner Mfg. Co., Tulsa, Oklahoma. Export Office: 149 Broadway, New York.

Complete Gaso Condensed Catalog, in 1937 Composite Catalog.

GASO PUMPS
for every oil industry need

Tepetate oil field, in Acadia Parish, Louisiana, were not anticipated.

Six years later, with the number of reflection seismograph crews operating in the area increased to seventy, the following developments can be directly attributed to the use of the reflection seismograph.

1. *Better definition of marginal and sub-marginal prospects previously indicated by the torsion balance and refraction seismograph.* The first confirmation of the predictions of this method was made by Vacuum Oil Company[5] in B. T. Waite 1, at the Iowa oil field, Calcasieu Parish, Louisiana, on October 22, 1931. The analysis of this area, a prospect previously indicated as marginal by the torsion balance and refraction seismograph, was made by the use of accumulated plotted dips, and is shown in Figure 2A, with interpretation of the subsurface, as now postulated, shown in Figure 2B.

The discovery of oil in a structure of this type naturally stimulated the search for others, generally called "Iowa" types of subsurface structure. Shortly thereafter this method was used on those (non-geophysically predicted) oil-fields like Goose Creek, Welch, Orange and Houma which had formerly been called "non salt dome" oil-fields. These were all found to be typical "Iowa" types of structure. Examples of other "Iowa" types of structure, later indicated as such as a result of the use of the reflection method, are Anahuac, Hastings, Bosco, Turtle Bay, and La Fitte, all of which were marginal prospects indicated by either, or both, the torsion balance and the refraction seismograph.

Comparison of contours drawn on seismic reflection data prior to drilling with actual well data contours in the Iowa, Louisiana, field.

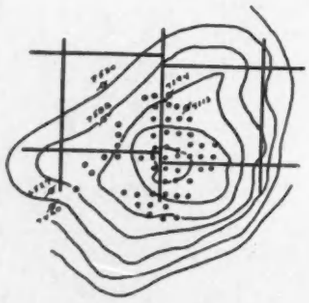


FIGURE 2-A
Seismic reflection contour prior to drilling.

FIGURE 2-B
Contoured on well data on Heterostegina sand.

So, in addition to displaying the higher finding power needed to evaluate the marginal and sub-marginal prospects previously indicated by the torsion balance and the reflection seismograph, this method also served to first definitely classify these anomalous "non salt dome" oil-fields discovered in the pre-geophysical days.

2. *Prediction of Occasional Marked Uniformity in Gulf Coast Sedimentation.* During 1929, 1930 and 1931, some geologists, and some geophysicists, admitted the possibility of getting reflections in the "hard rock" country, where alternate bands of shales, sands and limestones occurred, but refused to admit the possibility of getting reflections from the Gulf Coast sediments, where reflecting horizons similar to the Viola Limestone and the Austin Chalk had not been indicated by the drill. In addition, many more geologists and geophysicists refused to admit the possibility of correlation of reflections in the Gulf Coast, where the sedimentation was supposed to be, laterally, anything but homogeneous. Naturally, there was little credence given to the thesis that correlation of reflections from shot point to shot point was occasionally possible.

The success of electrical logging in the Gulf Coast confirmed this earlier prediction by the reflection seismograph. In fact, after this was established, many of those who had previously come to scoff, remained to pray, and also to sway to the other extreme; namely, that much more correlation was possible than even the earlier proponents of correlation had believed.

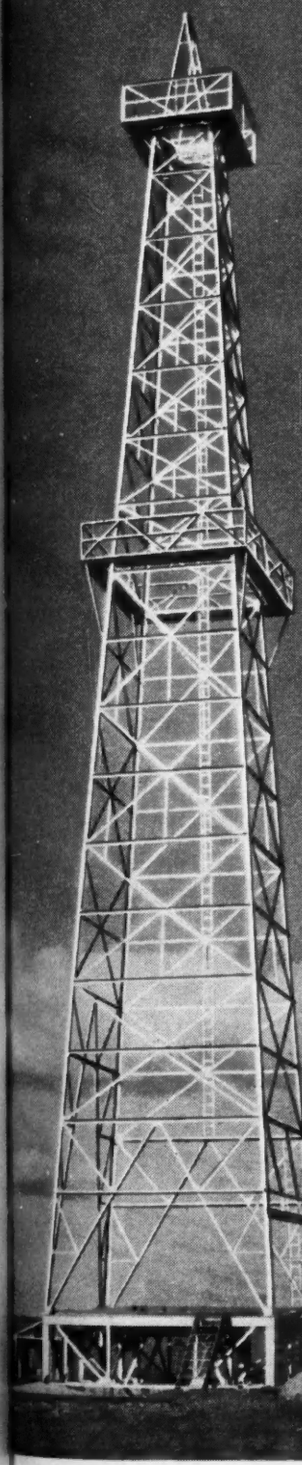
3. *Prediction of Faulting in the Gulf Coast Structures.* Prior to the introduction of the reflection seismograph into this province, the possibility of faulting, although occasionally recognized and recorded in the literature,[6] was not generally accepted. A rather prevalent idea was that the Gulf Coast sediments would bend and not break under the stresses and deformations involved in the formation of salt domes.

However, shortly after the introduction of the method, and during the period when the dip method of exploration was generally relied upon, closed dip traverses were frequently found which failed to close by appreciable amounts. In March 1933 [7] the writer suggested the use of the word "mis-closures" for such large errors in closing, and also suggested that such mis-closures were due to the presence of material faulting in these Gulf Coast structures. With the introduction of the better well correlation resulting from electrical logging, the presence of such types of faulting was later demonstrated, and found to be, quite frequently, of material commercial importance.

4. *Focusing of Attention upon the "Tepetate" Type of Structure.* The "Tepetate" type of structure has been so named from the field of that name found in August 1935 by Continental Oil Company in Vincent[2] in Acadia Parish, Louisiana. It is best described as an oil-field in which accumulation is primarily due to the closure produced on a flat nose by a fault downthrown down the regional dip, as shown in Figure 3A. This interpretation of the structure was made by correlations from a reflection seismograph survey, before oil was produced, and later confirmed by electrical logging in subsequent wells, Figure 3B. At least one other type of field had been found prior to the recognition of this kind of accumulation at the Tepetate Field, the Louise Field in Wharton County, Texas. Other fields in the Gulf Coast now generally recognized as of that type are Hamman and Eureka. Two additional prospects of this same type are now being tested by the drill. Localities where this type of structure is important are those where regionally high wells are dry, and regionally low wells produce oil.

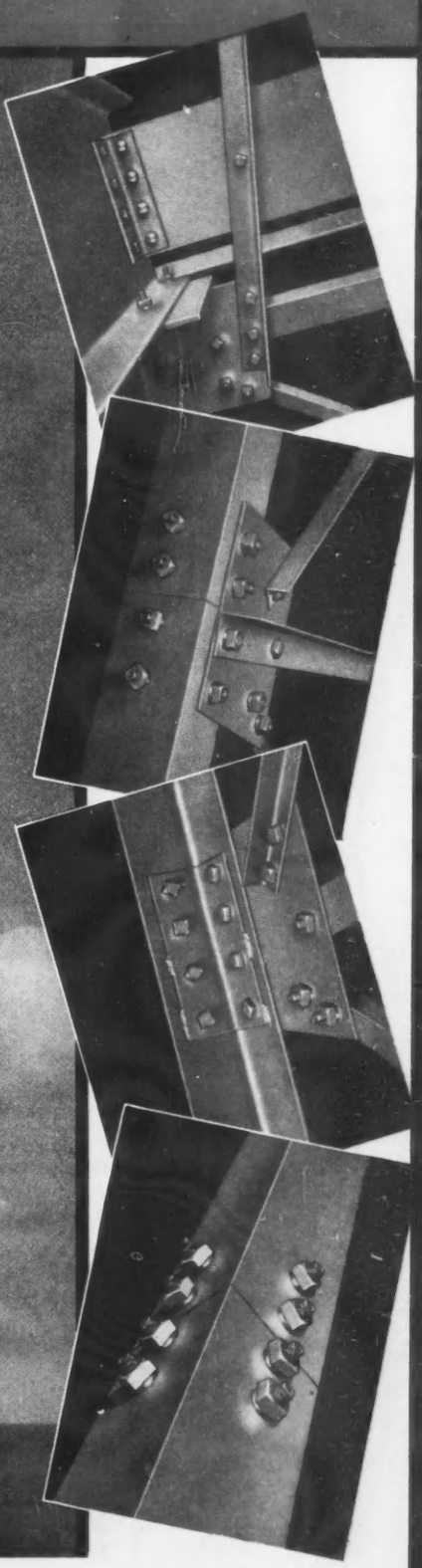
5. *Prediction of Regional Faulting.* As soon as the general characteristics of the "Tepetate" type of structure were recognized, operators of reflection seismograph crews, recognizing that similar anom-

M.I.W. STEEL DERRICKS



From Sub-Structure to Gin Pole, M.I.W. Steel Derricks are built for capacity loads and greatest safety. M.I.W. Derricks are designed on the old theory that simplicity of design and least number of parts make for the best construction and quickest assembly. Twenty-seven years in the structural steel business—thirteen years experience in building derricks—a staff of highly trained engineers—the application of the practical field experience of oil men—these combine to make possible the engineering achievement of distinctly superior derricks of many unusual features and refinements.

Complete Stocks Available For Every Point in Mid-Continent Field.



WRITE FOR NEW M. I. W. CATALOG

MUSKOGEE IRON WORKS

STEEL DERRICKS SUBSTRUCTURES ENGINE BASES FRAMING SILLS

RIG FRONTS SKID-TYPE HOISTS

1802 Esperson Bldg. Houston, Texas | Gulf States Bldg. Dallas, Texas | Main Office and Plant Muskogee, Oklahoma | Thompson Bldg. Tulsa, Oklahoma | Kilgore, Texas

Comparison of contours drawn on seismic reflection data prior to drilling with actual well data contours in the Tepetate, Louisiana, field.

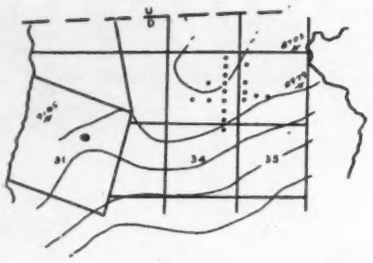


FIGURE 3-A
Contoured on seismic reflection data.

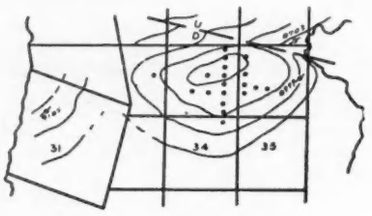


FIGURE 3-B
Contoured on the producing sand.

alies had been found east and west of the "Tepetate" Field, started a detailed examination of that trend. As a result, several similar anomalies have been found along a regional strike fault extending for a distance of approximately 100 miles east and west. This fault system is uniformly downthrown to the south with throws varying from 100 to as much as 600 feet. There are several other suggestions of such regional faults, and in each case the indication is that the faulting is downthrown down the regional dip.

Developments in the Method

Since 1929, when the method was first introduced on a commercial scale in the Gulf Coast, definite improvements have been made in interpretation methods, field methods and apparatus, discussed below as follows:

1. *Interpretation Methods.* The possibility of using dips, as calculated from the step-outs on the records, was first recognized in the Gulf Coast in 1929. One very important development of this method was the use of closed dip traverses, and the postulation that some of the large mis-closures in some of these closed traverses was due to faulting. The location, direction and throw of such "dip" faults are recognized to be qualitative rather than quantitative, but such analyses have always proved at least interesting and illuminating, and frequently have been the only possible method of attack because of the frequent absence of correlatable reflections.

In some areas, however, where apparently the Frio sand is thick and well developed, excellent correlatable reflections have been obtained from that interface. In such and similar cases, it has been possible to map structure and indicate the existence of faulting on "correlatably" reflecting horizons.

An outstanding development was that, in the case of some exploration of faulting on such horizons, the presence of double reflections near the location of the fault were so well developed that their existence was laid to reverse faulting (repetition of section) rather than to diffraction, the correct explanation (for as a result of drilling through such faults, short rather than long sections were found).

2. *Field Methods.* In the early stages of reflection exploration in this province, the quality of recording apparatus varied considerably, for some of the operators relied entirely upon shallow hand-dug shot-holes, while others had to rely upon deeper machine-dug shot-holes, required in order to eliminate the undesirable surface waves. However, with the depth of drilling increasing to nearly 12,000 feet, and the resulting need for deeper exploration, the use of machine-dug shot-holes has become almost general.

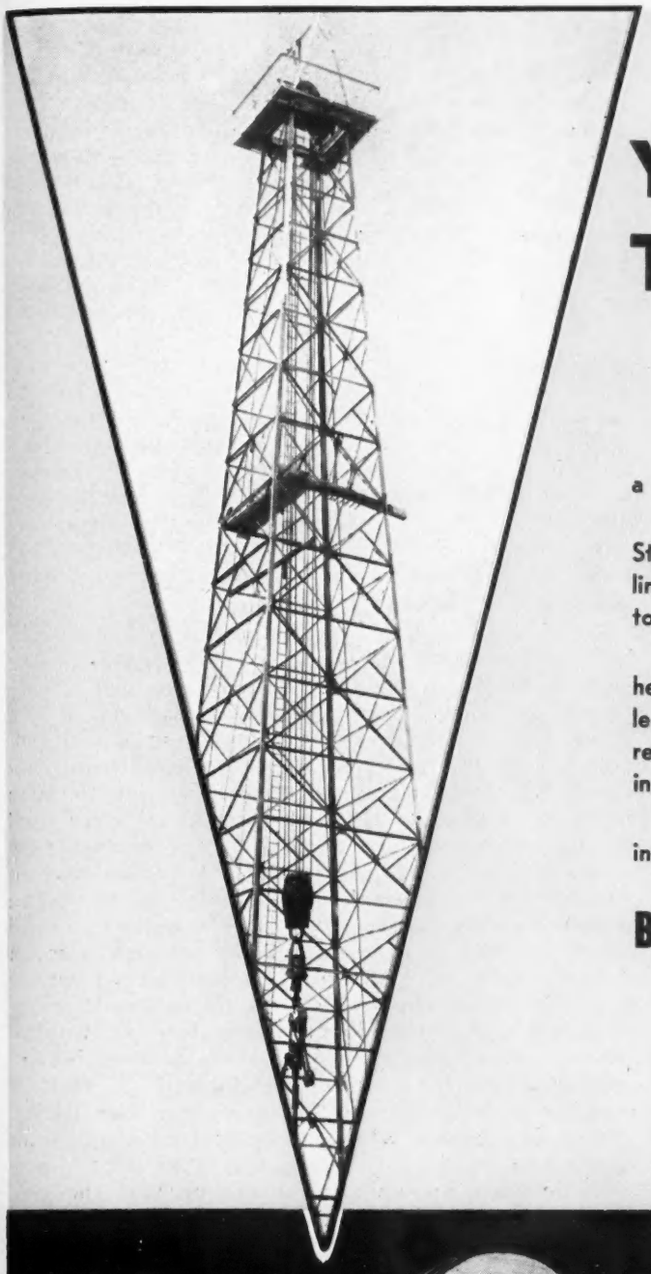
One interesting development in shot-hole drilling has been that of jetting shot-holes in swampy and marshy areas by the use of water-jets from portable gasoline-engine (outboard motor) driven centrifugal pumps. With this definite trend toward the use of deeper shot-holes, one of the dynamite manufacturers[8] directed attention to the probability that the dynamite generally used was not exploding properly at the depths and pressures involved. By the introduction of a special dynamite, the average size of the charges has decreased, with resulting better-quality records and practical elimination of misfires.

The need for accurate "time breaks," or shot instant recording, has led to a definite improvement in the quality of the electric caps available. [9] Those now furnished to this industry are remarkably uniform, and have much more desirable characteristics than those formerly available.

An interesting development in field methods has come about in the use, by about half of the operators, of composite or multiple recording.

The possibility of using the directional transmission employed successfully in commercial radiotelegraphy had occurred quite early to the members of Geophysical Research Corporation staff. Dr. F. M. Kannenstine, then in charge of their laboratory, suggested such a possibility in 1927, and made some field experiments to see if such possibilities were real. His attention was primarily focused on the possibility of using charges distributed either in space or time. At that time, however, he was unable to observe any improvements which could be attributed to the use of multiple shots. Shortly thereafter E. G. Taylor secured U. S. Patent No. 1,799,398 for a method of multiple recording in which he had hoped to accomplish the same end. This patent was purchased by Geophysical Service, Incorporated, in 1930, and from that they have developed a system of so-called "composite recording."

Although the Taylor patent was primarily directed at the use of geophones disposed along half-wave positions, in order to eliminate the refracted wave, the developments made by the G. S. I., and copied by several other field operators, have been in the direction of using a large number of geophones located on the surface of the ground, and generally more or less inter-connected. They claim that thereby they are able to make a directional reception of the reflected wave. At present, the operators are equally divided in regard to their favoring this method of reception. It is a little difficult to understand why, with physicists capable of developing these methods and making successful interpretations of the results, such a dispute should continue to rage for several years. When the physicists, so



You Can't Figure The Drilling Cost In Advance

But you can save a lot of that cost in advance by using a "Flex-Set" Preformed Yellow Strand Rotary Line.

Long before preforming was developed, regular Yellow Strand was well recognized as "the tops" among rotary lines. It always saved drilling costs because of its amazing toughness and long life.

Permanently preforming the wires and strands to the helical form they occupy in the finished rope further lengthens its already long life. Internal stress is greatly reduced. The rope is more flexible; easier to handle and install; remarkably resistant to drum crushing and fatigue.

"Flex-Set" Preformed Yellow Strand is reducing drilling costs in every rotary field. Try it!

Broderick & Bascom Rope Co., St. Louis

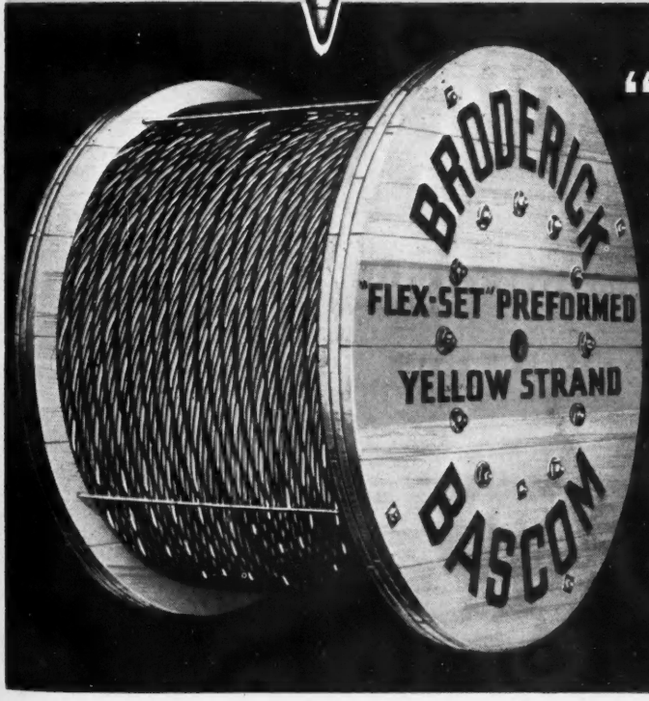
Factories: St. Louis, Seattle, Peoria

Houston Branch: 1311 Palmer St., Houston, Tex.

The Continental Supply Co.

Mid-Continent and Rocky Mountain Distributors

V-11R1



"Flex-Set" Preformed YELLOW STRAND ROTARY LINES

called, who are in dispute as to the merits of this method are unable to agree, the diverse opinions of the geologists concerned in the use of these methods is no more difficult to understand.[10]

A modification of this attempt at directional reception has recently appeared on the scene. This modification has been described by Frank Rieber.[11] The method which he has developed is mose interesting. Instead of recording the seismograph impulses on a strip of sensitized paper by the usual galvanometers, he records the seismograph impulses on a film in the same manner that sound-tracks are made for talking motion-pictures, and so secures a seismograph record which is repeatable, and is also subject to mechanical analysis. Rieber combines the impulses from ten or more seismographs distributed over the surface of the earth, each recording on an individual sound film, into one composite record. This he does by scanning the individual strips in accordance with possible angles of emergence throughout nearly 180 degrees. At given angles of emergence, particular reflections are best developed. Thereby, he claims to secure a definite improvement in directional reception. He calls his method "Controlled Directional Sensitivity," and alleges that this method of reception and analysis is utilized to the greatest advantage in the exploration of highly folded and faulted structures. Although actual results of his new method are not available, this development will be watched with great interest by all interested in the future development of the art. It is obvious that there is a possibility that this method originated by Rieber will combine the advantages of both the recording methods now in dispute. The fundamental objection to the composite method of receiving is that thereby the impulses are scrambled before they are recorded. However, Rieber first records his impulses and then later scrambles them at will.

Material improvements in the apparatus have taken place in the equipment used here, as in other parts of the United States. There are three definite improvements as follows:

1. Machine Cranking.
2. Volume Control.
3. Elimination of Oil for Damping.

These will be taken up in order below.

1. *Machine Cranking.* The introduction of machine cranking in taking the records was made in an effort to assist the interpreters in correlation work. The first field oscillographs were cranked by hand. However, when this hand-cranking was replaced by machine-cranking, either in the form of a spring motor or an electric motor, correlation was materially facilitated, because the distribution of timing lines along the records was made much more uniform, and similar times on different records could be compared directly. Variations in arrival times of similar reflections were made much more obvious. Also, the opportunity to compare the quality of individual reflections was facilitated, because then a given reflection impulse always occupied the same space on a record.

2. *Volume Control.* In the case of the first reflection records taken, they usually started off with a maximum amplitude immediately after the first arrival, decreasing to ground static level at the end of the record. As a result, there was only a limited part of the record in which the amplitude was neither too great nor too small to be useful. Preliminary attempts at controlling the volume of these recorded amplitudes were made by those operators who favored the use of string galvanometers. In order to keep these strings from overlapping during the early stages of this great amplitude, the amplitude of the string vibration was controlled by a rheostat, operated manually, connected across the strings. This method, however, had only two positions, and so the "volume control" was not uniform. As a substitute for this, a semi-automatic volume control was later introduced which made it possible to keep the amplitude on the record readable at all times. There is one rather strong objection to the use of such types of semi-automatic volume controls. When these are used, the first breaks, which are of greatest importance in making corrections for the surface low-velocity layer, are generally nonexistent, or of an amplitude so low that they cannot be accurately read, and as a result the corrections for this low-velocity surface layer are made much less reliable.

3. *Elimination of Oil for Damping.* As a general rule, most of the geophones or seismographs used in the early reflection recording were oil-damped. Since year-round variations in field temperatures of 100° F. are not at all uncommon, and all the oils in general use have marked temperature coefficients of viscosity, there is an obvious objection to such methods of damping. If one type of oil were used throughout the year, the geophones were extremely insensitive in winter, but satisfactorily sensitive in summer. What generally happened was that when winter arrived, the observer would replace the oil which he had used in his geophone with a much lighter grade of oil. Then during the winter he got satisfactory sensitivity and satisfactory damping. However, with the advent of summer, he was, of course, not averse to the apparent increase in sensitivity which the geophones exhibited. In fact, he was rarely conscious of the increase in sensitivity, and so, in summer, while the dynamite charges went down, the quality of the records also went down. This decrease in quality occurred because the geophones were not satisfactorily damped in the higher operating temperatures in summer. Some of the operators have gone over to the use of either air-damping or electro-magnetic damping for their geophones. The construction of such field-worthy geophones has been a definite contribution to field practice.

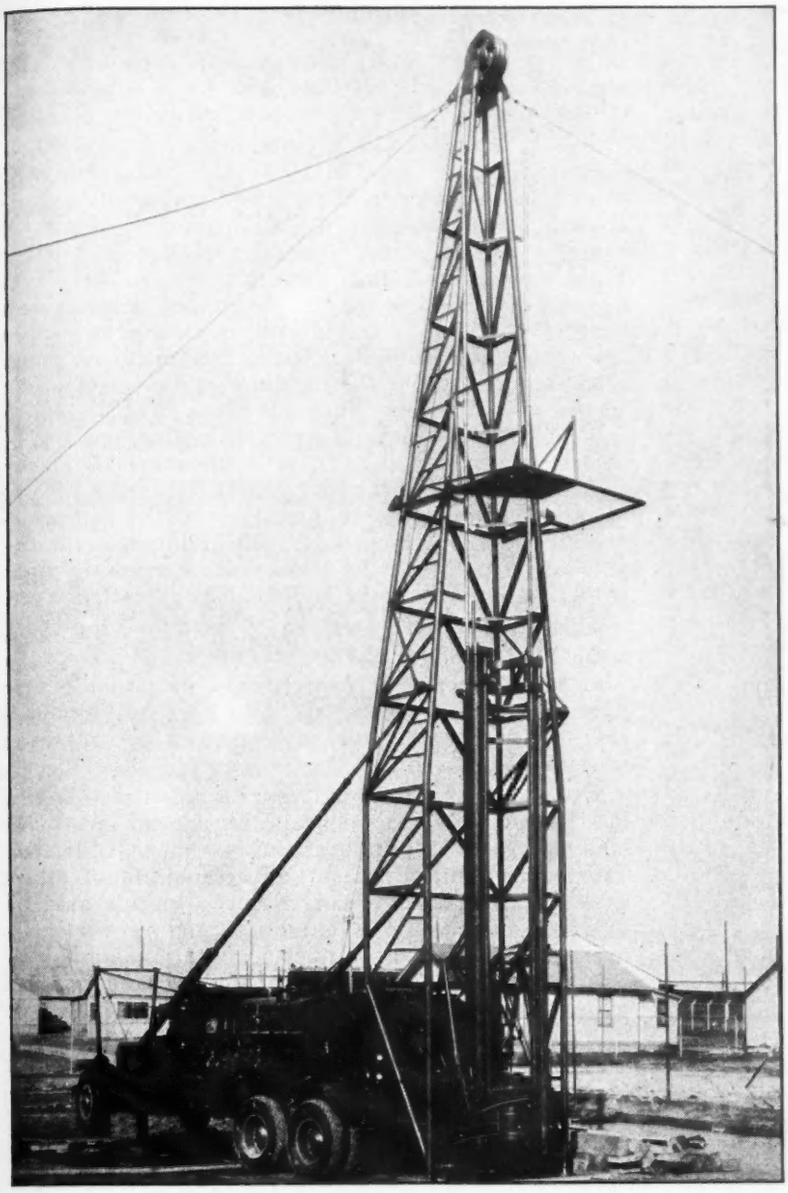
The Future

At this point, a *resume* of the fundamentals of prospecting strategy may be appropriate. The basic theorems are as follows:

I. Discovery at a premium can be expected to follow from:—

A. *The Use of a New Method with Higher Finding Power in an Old Area.* Example: The introduction of the reflection seismograph into the Gulf Coast in 1929, which by virtue of its higher finding power was able to convert marginal and submarginal prospects of the preceding methods, the torsion balance and the refraction seismograph, into the oil-fields of Hastings, Anahuac, La Fitte and others.

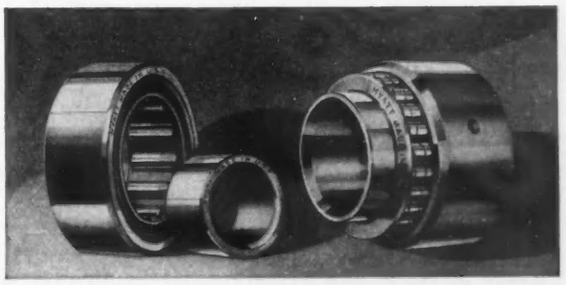
B. *The Use of an Old Method in a New Area.* Example: The use of the refraction seismograph in the lakes and bays of South Louisiana in 1927 and 1928, as a result of which eleven salt domes were



In the power pump, mast head and drums of this portable drilling unit, built by **FRANKS MANUFACTURING CORP.**, Hyatts are guarding the important operating parts from bearing wear and care.

Where *Wear* is a problem... the answer is HYATTS

• Hyatt Roller Bearings are designed and built to withstand the strains of punishing speeds and loads, to preserve the original accuracy of the related parts they serve. Wear and its resultant difficulties are reduced to a minimum by these better bearings. Thus, to your own operating equipment, or to the machines you build, Hyatts contribute permanent bearing satisfaction, long life, and maintenance economies. Hyatt Bearings Division, General Motors Corporation, Newark, Detroit, San Francisco. Hyatt Roller Bearing Sales Company, Chicago and Pittsburgh.



HYATT

ROLLER BEARINGS

discovered in nine months, the highest rate of finding ever experienced in this area.

C. *The Use of an Old Method in an Old Area, but with a New Objective.* Example: The use of the reflection seismograph method in the East Texas Syncline with structure on the Georgetown Limestone as an objective. Although the area had been properly explored by the same method on the Pecan Gap Chalk and the Austin Chalk, at least two new fields, Cayuga and Long Lake, have been found since, for over those structures there is material closure on the Georgetown, and little if any on the Austin and Pecan Gap Chalks.

D. For an exploration campaign [12] rather than for a prospecting sortie, discovery at a premium in a given area, can be expected to follow from:

1. The discovery of prospects by the appropriate method of lowest operating cost, and the evaluation and culling of these prospects by the successive use of the appropriate methods of higher finding power (successive high grading).

2. Prospect development in a particular area should not be initiated by any given method until the area has been explored by the appropriate methods of lower cost.

Example: The most successful operator of the reflection seismograph in the Gulf Coast to date is Stanolind Oil and Gas Company, who steadfastly adhered to the policy of locating prospects by the torsion balance and evaluating then by the reflection seismograph.

3. An apparent exception to this rule is the early use of the reflection seismograph recently proposed [13] in the evaluation of sedimentary thicknesses when such data are not available from wells.

Example: The prediction, by the reflection seismograph, that the sedimentaries were only 2800 feet thick on the Chadron Uplift in Northwestern Nebraska, but more than 7000 feet thick in Southwestern Nebraska, before any such information was available from wells.

II. The introduction of a method of higher finding power immediately raises the potential value of the marginal and submarginal prospects remaining from the previous methods of lower finding power, and therefore a renaissance of the former methods is possible and often desirable, for thereby prospects can usually be found cheaper than they can be discovered by a blanket exploration with the new method. With the arrival upon the scene of a new method of higher finding power, foresighted operators will seize every opportunity to complete their libraries of data resulting from the use of the methods of lower finding powers, even though that means the acquisition and purchase of negative data.

Example: The introduction of the reflection seismograph into the Gulf Coast put a premium upon torsion balance and refraction seismograph data in the area. Several foresighted operators took every opportunity to complete their torsion balance networks by the acquisition and purchase of negative data previously secured by other operators.

Conclusions

With these rules in mind, a reasonable expectation is that, unless a method of higher finding power appears upon this scene, the present activity in reflection exploration should decline materially in the future. If such a method should appear within the next six months, the decline will be postponed until the major operators now using the method have completed their blanket explorations of the Gulf Coast. If the introduction of such a method is postponed for more than a year, then following such an introduction, there will be a smaller secondary peak in the reflection seismograph activity.

Simply because such predictions are logical, however, there is no reason to believe that they will come true. Activity in the method may continue unabated, as is the case in California at present. A rough estimate places the cost of the Old River Field (recently found there by Shell Petroleum Corporation, following a reflection seismograph survey), to the industry in California of between ten and fifteen million dollars for reflection seismograph work alone. While there seems to be some effort to put this discovery into the class of I. C. above (old method, old area, but new objective, because of somewhat greater depth), still the state of affairs was evident several years ago. If half that amount of money had been intelligently invested in the development of new methods of oil-finding, it is reasonable to believe that the California reserves in sight would be much greater now than they actually are.

Therefore, foresighted operators in the Gulf Coast will probably do two things:

1. Make intelligent investments in possible new methods of oil-finding with potential finding powers still higher than are available in the methods now in use.

2. Complete their blanket explorations of this area by the reflection seismograph in the shortest possible length of time and at the lowest possible cost. This means the purchase and acquisition of otherwise negative data already secured in this area by other operators. The completion, and proper interpretation, of such a blanket exploration should result in complete information as to all the possible marginal and submarginal prospects which can be found in this province by the reflection seismograph, which method has the highest finding power of any method used to date in this area on any intensive scale.

Acknowledgments

The writer wishes to express his indebtedness to H. C. Cortes, of Magnolia Petroleum Company, for helpful comments and other assistance, and also to O. L. Brace, consulting geologist of Houston, who contributed the subsurface contours presented for the Iowa and the Tepetate oil fields.

References

[1] "Applications and Limitations of Dip Shooting," by E. E. Rosaire and Joseph L. Adler, *Bull. Amer. Assoc. Petr. Geol.*, 1934, **18**, 119-132.

[2] The Geophysical History of the Darrow Salt Dome, Ascension Parish, Louisiana. Paper presented at the Annual Meeting of the Society of Petroleum Geophysicists, March 19, 1936, Tulsa, Okla., by T. I. Harkins.

[3] "The Growth of Company Owned Operations in the Gulf Coast since 1930," E. E. Rosaire and K. Ransone, *Geophysics*, 1936, 1.

[4] "On the Strategy and Tactics of Exploration for Petroleum," E. E. Rosaire, *J. Soc. of Petr. Geophysicists*, 1935, **1**, 11-26.

[5] "Cameron Meadows and Iowa," L. P. Teas, *Bull. Amer. Assoc. Petr. Geol.*, 1932, **16**, 255.

[6] "The Racoon Bend Oil-field, Austin County, Texas," L. P. Teas and Charis A. Miller, *Bull. Amer. Petr. Geol.*, 1933, **17**, 1459-1491.

[7] "Applications and Limitations of Dip Shooting," E. E. Rosaire and J. L. Adler, *Amer. Petr. Geol.*, 1934, **18**, 119-132.

[8] "Explosives for Seismic Prospecting," N. G. Johnson and G. H. Smith, *Geophysics*, 1936, **1**, 228-238.

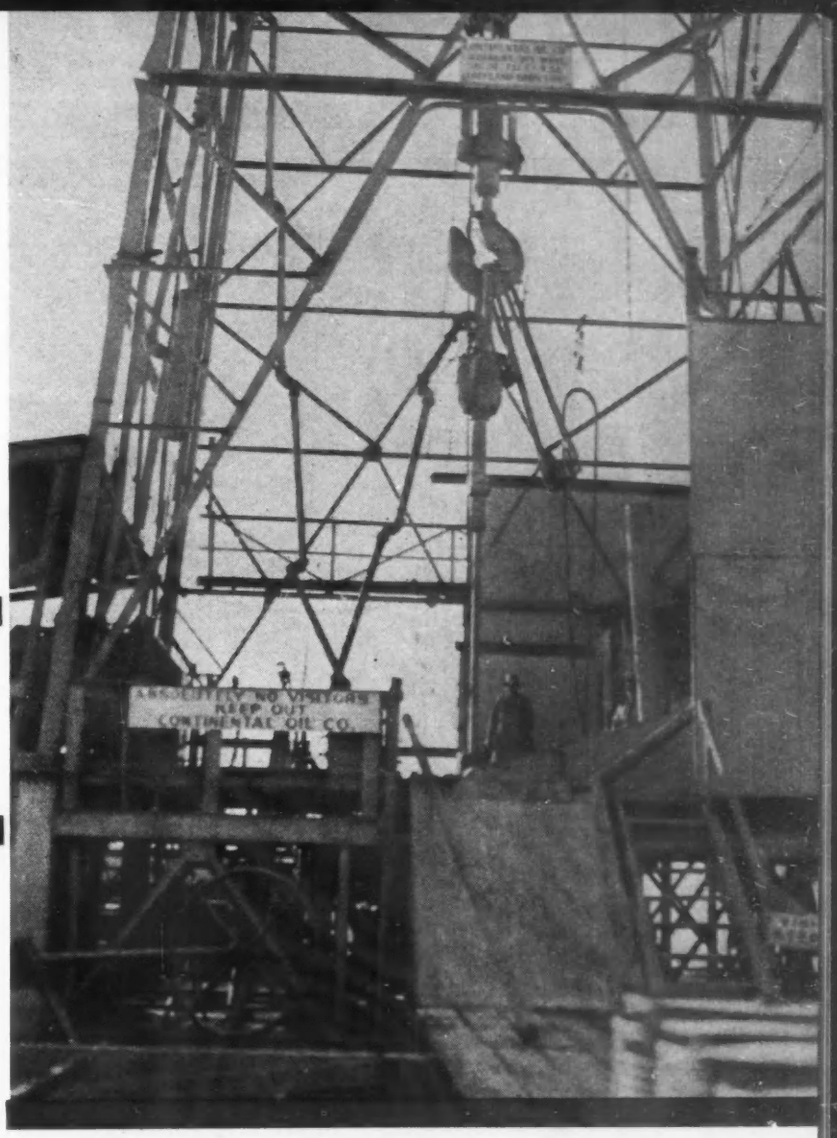
[9] "Relation between Firing Current and Performance in Seismograph Caps," L. A. Burrows, *Geophysics*, 1936, **1**, 219-227.

[10] "Some Aspects of Multiple Recording," P. W. Klipsch, *Geophysics*, 1936, **1**.

[11] "A New Reflection System with Controlled Directional Sensitivity," F. Rieber, *Geophysics*, 1936, **1**, 97-106.

[12] "On the Strategy and Tactics of Exploration for Petroleum," E. E. Rosaire, *J. Soc. Petr. Geophysicists*, 1935, VI, **1**, 19.

[13] "A Proposed Geophysical Program of Exploration for Nebraska and the Dakotas," J. H. Wilson, *Geophysics*, 1936, **1**, 194-195.



Continental Oil Company's Hebert 1, Vermilion Parish, Louisiana, in which an indicated bottom-hole pressure of more than 8,000 pounds per square inch was developed at 12,216 feet.

METHODS OF

Controlling Pressures

By BRAD MILLS, Associate Editor

CONTROL of high formation pressures has become an important phase of Gulf Coast drilling operations. The abnormal pressures encountered in a few deep wells, and normal pressures in others, present new problems that are being and will be solved by the use of special muds and heavy surface equipment. The presence of gas in many of the deeper formations seriously complicates pressure control and calls for constant attention to the drilling fluid.

The energy stored in deep producing formations provides the necessary flowing medium, but its control during drilling operations often is difficult. Although accurate bottom-hole pressures have not been obtained in the deepest wells drilled along the Gulf Coast, the indicated formation pressure in one well was above 8000 pounds per square inch. In another well the indicated bottom-hole pressure was 7800 pounds—abnormal for a well less than 9000 feet deep. With shut-in pressures of 5000 pounds, the bottom-hole pressure in these two wells undoubtedly established new records.

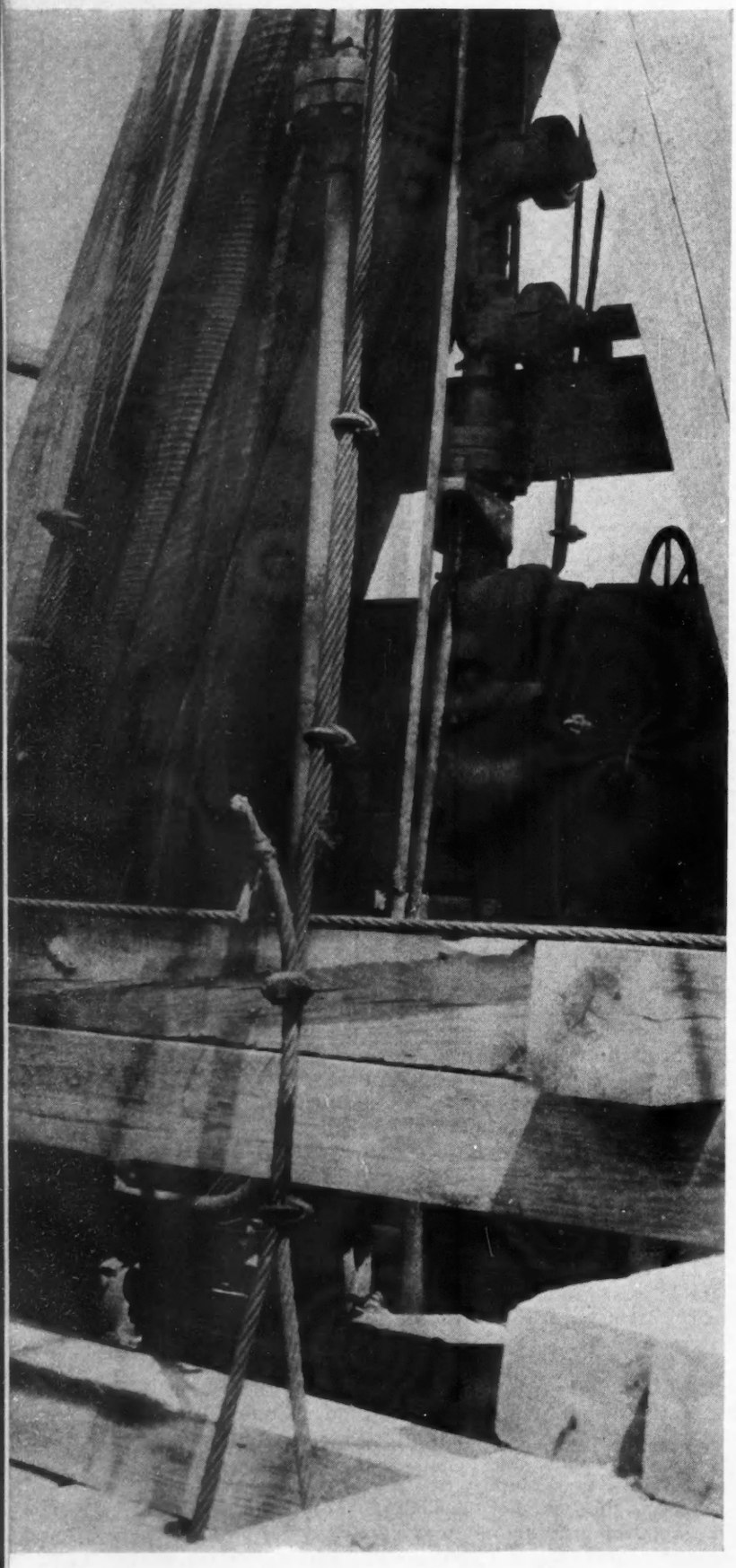
Both high-pressure water and gas formations have been encountered in the troublesome deep wells drilled during the past year. In both cases the chief method of attack has centered on the drilling fluid. The mud first reflects the presence of high-pressure gas or salt water, and it is the mud that suffers most during drilling in these troublesome formations.

Abnormal pressures in a few wells have revised the scale for anticipated pressures between 8000 and 13,000 feet. Lack of accurate pressure data has left room for argument as to the existence of phenomenal pressures at depths now within reach of the drill, but registering of shut-in pressures almost as high as anticipated bottom-hole pressures has done much to support the theory that a new scale is needed for certain Gulf Coast areas.

Abnormal Condition

The high formation pressures encountered by Stanolind Oil & Gas Company in the new Clinton, Texas, field reflect a freakish or abnormal condition that is difficult to account for. One well, after being brought under control, showed a shut-in pressure of 5100 pounds and an indicated bottom-hole pressure of 6800 pounds. The second well showed an indicated bottom-hole pressure of 7800 pounds at a depth of less than 8800 feet. Such indicated bottom-hole pressures between 8000 and 9000 feet do not check with any recognized scale, but at least two reasonable theories for the abnormal pressures have been advanced.

The first well drilled in the field, Angelo Candelari 1, was spudded September 3, 1936, and drilled to 7015 feet with little difficulty. At this depth circulation was lost to the formation and gas entered the hole. Weight material was added to raise the mud weight to 10.7 pounds per gallon from 9.4 pounds, and the formation took mud for only a short time. Circulation was restored and the gas pumped off through a 2-inch choke with the rams closed. The formations were shale with sand streaks that could not be walled off because of gas breaking into the hole. After each trip it was necessary to pump off a large head of gas. Mud weight was raised to 11 pounds but the increase helped little. A string of 7-inch casing was run to 7500 feet to case off the



Stanolind Oil & Gas Company's Angelo Candelari 1, discovery well in the Clinton, Texas, field, which had a shut-in pressure of 5,100 pounds per square inch and an indicated bottom-hole pressure of 6,800 pounds. It was completed with drill pipe in the hole.

upper gas strata, and drilling progress for several hundred feet was satisfactory.

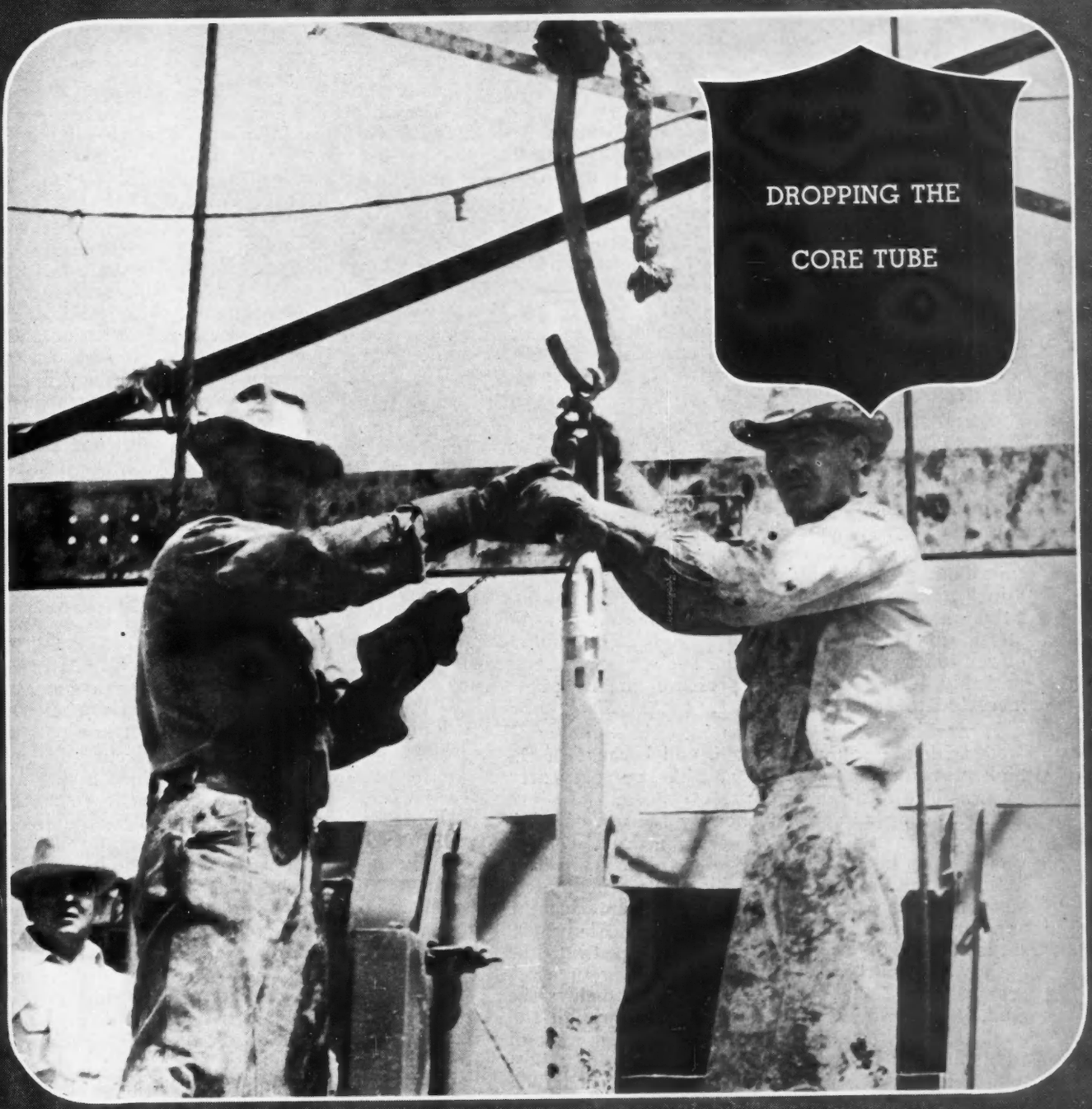
At 8100 feet the bit cut into a soft formation, and after drilling 8 feet in the soft stratum, the driller decided it was sand and started to pull up into the casing to run the core barrel. After pulling up 2 joints, mud started running out of the flow line and over the top of the drill stem. The 2 joints were dropped back, the blowout preventer closed, and the kelly joint stabbed in the drill stem. The bit remained 25 feet off bottom, as this was the amount down on the kelly.

An attempt was made to circulate through the flow line, but mud blew out so fast it was necessary to close the flow-line valve and install a ½-inch choke in the 2-inch bleeder line from the blowout preventer. The bleeder line valve was opened and mud pumped through the 3-inch drill stem. Nothing but dry gas flowed from the bleeder line. All of the mud in the hole was lost to the formation in a short time and gas continued blowing. All available mud was pumped into the hole through the drill pipe, but it was lost to the formation. About 180 sacks of weight material was added to the mud and pumping continued through the 3-inch drill stem with a pump pressure of 1200 pounds. The bleeder line was closed on the 7-inch casing and the mud pumped into the formation with no reduction in pressure. A total of 650 barrels of mud was pumped in, and to it was added 25 sacks of synthetic mud in an effort to build a thick drilling fluid that would wall up the apparently loose and porous formations. The pump pressure rose rapidly to 1600 pounds and the pumps, compounded, would not carry the load. Even while bleeding off gas through ½-inch choke on the casing, it was impossible to pump into the 3-inch drill stem. Special steam-driven cementing pumps were connected to the top of the 3-inch drill pipe, and thick mud pumped into the drill stem at 2100 pounds pressure. The pressure rose to 2400 pounds after pumping 24 barrels of mud, although wet gas was being bled from the casing during all pumping operations.

The mud hose began to leak with the pumps shut down and a pressure of 2800 pounds on the 3-inch drill stem. The mud hose broke loose from the standpipe at the tee, whipped around while blowing mud and gas, finally caught between a girt and brace, and continued to blow wet gas.

Controlling the Well

A fire fighting company was called to break out the kelly joint from the top of the drill stem. After doing this the blowout preventer was stabbed off the tool joint on the drill pipe upside down, with a 7-inch gate valve and a joint of 7-inch casing on top. One side of the blowout preventer was closed with a bull plug, and the other side was equipped with a 2-inch nipple, 2-inch gate valve, a second 2-inch nipple, another 2-inch gate valve, and a ½-inch choke on the outside. After snubbing the blowout preventer into place, the rams were closed. Tie



PENNINGTON'S SIGNALLING CORE BARREL

WIRE LINE TYPE, established new, higher standards of: Core Recovery, Precision and Rapidity.

Manufactured in our own new, modern plant

UNITED STATES
HEAT TREATING COMPANY, INC.
SAN ANTONIO, TEXAS

rods were placed across the preventer to hold the 2-inch line and bull plug in place, and the entire blowout preventer was snubbed down to the derrick substructure with chains. An attempt was made to close the 7-inch gate valve, but the valve would not completely close.

The blowout preventer, 7-inch valve, and joint of casing then were removed. A 3-inch tool-joint pin with swage, 4-inch valve, and a joint of 4-inch drill stem were stabbed into the 3-inch tool-joint box on the 3-inch drill stem and snubbed down securely from 2 elevators, one clamped just above the master gate and the other just above the tool-joint. The 4-inch, 6000-pound-test gate valve then was closed and the well was under control.

Fortunately the well made no sand, and all connections were in good condition. Above the 4-inch valve were placed a 2-inch valve, a tee, and 2 special steel hose lines with valves and chokes in each line. High-pressure pumps were connected to these lines, a steam-driven unit tied to one and a motor-driven unit connected to the other. The steam unit built up a pressure of 2500 pounds with the 4-inch gate valve on the drill stem closed. The gate valve then was cracked, and the pressure on the steam unit built up to 2800 pounds. The motor-driven unit was started but the back-pressure valve probably leaked, since the pressure on the pump increased to 4800 pounds.

It was impossible to pump into the 3-inch drill stem with the equipment used, and because of the high pressure on the casing and blowout preventer, gas was bled off from the annular space in the 7-inch casing. This was accomplished by the use of graduated chokes, the pressure dropping from 4700 to 1500 pounds in 20 minutes. The rapid pressure drop indicated the presence of a bridge between the drill stem and the casing, and that gas was entering the annular space through the tool joints. About 500 sacks of special 17-pound mud was pumped into the casing around the drill pipe. The casing pressure dropped when the gas was compressed below the mud, it rose rapidly as the gas broke through the mud. Meanwhile the tool joints were leaking and admitting gas into the annular space from the bottom of the hole. An adjustable choke was installed to hold the pressure at about 1800 pounds.

A valve arrangement was built above the 3-inch drill stem. Above the 4-inch valve were placed two 2-inch gate valves and a 2-inch gooseneck with a drop to the derrick floor. A 2-inch line from the floor to a valve manifold, and two 2-inch lines from the manifold to 7-inch vents were installed. The graduated chokes in the 2-inch lines included ¼-inch, ⅜-inch and ¾-inch chokes, and gas was bled through vent lines to flares.

A 10,000-pound calibrated pressure gauge on the line showed a shut-in pressure of 5100 pounds. A 5000-pound recording gauge on the manifold line later showed a shut-in pressure of 4800 pounds. The well was opened through a 2-inch line and a series of chokes, and the pressure dropped to 4400 pounds. When a second 2-inch line was opened the pressure dropped to 3850 pounds, but it later rose to 4100 pounds, at which pressure one of the lines was shut in.

Gas leaked around the 4-inch gate valve that was stabbed into the tool joint, and as the leak increased the new 2-inch, 10,000-pound test gate valve used to shut off the 2-inch flow line failed to open because of failure of the stem in two places. A decision was reached to remove the 4-inch valve and replace it with two 3-inch valves. The original intention was to permit the well to blow wild through the 3-inch drill stem, while attempting to stab on another manifold, but opening all flow lines reduced the pressure to 2000 pounds and prompted another method of attack.

The bull plug above the top of the 2-inch Christmas tree valve was removed, allowing the gas to blow through the assembly. The tie-downs were removed from the gooseneck and flow line and were disconnected. The 4-inch valves with the 2-inch valves above were removed by breaking at the 3-inch tool joint and snubbing it out. In its place was snubbed a 3-inch tool-joint pin welded into two 10,000-pound test 3-inch gate valves, with one side of the flange union on top. The tool joint was made up, the new Christmas tree tied down to the derrick superstructure, both 3-inch valves closed, and the well shut in. With the exception of the tool joint, which is clamped and has a flange union, all connections were welded.

Second Well

The second well drilled by Stanolind Oil & Gas Company in the Clinton field, D. A. Oates 1, was in some ways more interesting than Candelari 1. Both wells were drilled by Harrison & Dillard, drilling contractors, but the company cooperated closely during the difficult drilling periods.

After cementing a string of 7-inch casing at 7980 feet in D. A. Oates 1 and drilling to 8059 feet, the anticipated high gas pressure was encountered. The well started making heads of gas March 18, 1937, was shut in and circulated for two hours on a ⅜-inch choke. Mud weight dropped appreciably to 13.5 pounds. The mud weight was raised to 16 pounds, and later to 17 pounds, the mud having been gas cut each time returns were obtained from bottom after pulling the pipe off bottom for any reason. It was necessary to circulate and condition the mud for 24 hours before a trip at 8591 feet could be made. This was the last trip made before sticking the drill pipe.

During each attempt to pull the drill pipe from the hole between 8591 and 8783 feet, mud would follow the pipe out of the hole. The balancing point for the weight of the mud was exactly 17 pounds, and several times when the weight was increased to 17.4 pounds with a viscosity of 43 seconds A. P. I., circulation was immediately lost. When the pumps were slowed down and the mud weight decreased, normal returns were obtained and most of the lost mud returned to the pit. After pulling up into the casing and the hole would not take mud, the pipe was run back to bottom. The returns then came from bottom and the mud was gas cut to about 15 pounds per gallon for a very short period.

An attempt was made to come out of the hole with reverse circulation, in an effort to keep the hole full of mud and minimize the danger of lowering the hydrostatic head and reduce the swabbing action. Circulation was lost with this practice and only a few stands were pulled. Special equipment was rigged up for coming out of the hole, due to the low operating pressure of the ordinary swivel. Each stand was pumped out until the bottom of the casing was reached. The hole gradually took mud and six stands were pulled without circulation. It was

PUMPING THE CORE TUBE DOWN at 350 pounds circulating pressure. In 4½ minutes pressure lofts to 600 pounds . . . SIGNAL! The Core Tube has landed at 5,914 feet, and is ready to receive the core. No delays.

Core Recovery exceeds 100% of the depth drilled to cut the core. You explain why . . . we've quit trying.

Manufactured under production methods with finest alloy steels

UNITED STATES
HEAT TREATING COMPANY, INC.
SAN ANTONIO, TEXAS

necessary to resume pumping-out operations, and the pipe was pumped out to 3700 feet, at which level another unsuccessful attempt was made to pipe the pipe without circulating. The hole had become so unloaded that it was necessary to put the well on a choke and pump the pressure off. The pipe was returned to bottom of the casing and gas and salt water pumped off. The hole was plugged back from 8733 feet to 8643 feet in an attempt to shut off the salt water flow. The drill pipe was pulled and cement-cut mud circulated from the hole, but in a short time the drill pipe stuck and the conditioned mud dropped in weight from 17 to 15 pounds. The weight was built up to 17 pounds.

The addition of a special mud material reduced the weight to 16 pounds but freed the drill pipe. A head of salt water and gas reduced the mud weight to 12 pounds per gallon and occasionally the well made clear salt water. A special 17-pound mud was mixed to fight the salt water, but the hole bridged, stopped circulation and stuck the drill pipe. Mud in the drill pipe was displaced with water in an effort to make the formation take fluid, but the lowered hydrostatic head was not effective.

Calculation of Pressure

When the absolute weight of fluid in the drill pipe was known, the true hydrostatic head could be calculated and added to the surface pressure recorded. This gave indications of at least twice normal bottom-hole pressures. Water in the drill pipe was displaced with 17- to 19-pound mud, at which time the formation began to take fluid at 1900 pounds pressure. The 176 sacks of cement pumped into the drill pipe was followed by 48 barrels of 17½-pound mud. Pressure jumped to 4000 pounds, the pumps stopped, and 2800 feet of cement was left in the drill pipe. Casing pressure built up to 2700 while the cement was setting, but the pressure was bled off and mud pumped into the hole.

The hole was cleared to 8136 feet, plugged back to 8084 feet, and screen successfully landed after several attempts.

The principal Christmas tree connections used at both wells were tested to 10,000 pounds, and some actually were tested at a pressure of 15,000 pounds. The indicated bottom-hole pressure in Angelo Candelari 1 was 6800 pounds, while the indicated bottom hole pressure in D. A. Oates 1 was 7800 pounds per square inch. Both wells were controlled during drilling operations by constant attention to the drilling fluid.

Theories Advanced

Several theories have been advanced to account for the abnormal pressures encountered in the Clinton field. One theory that seems most acceptable and reasonable holds to the belief that the high-pressure shale section found just below 8000 feet originally was located at a much greater depth. When this section was lifted up, it was sealed and impervious enough to retain somewhere near its original pressure. Another theory suspects a connection between very deep, high-pressure formations and the 8100-foot shale stratum.

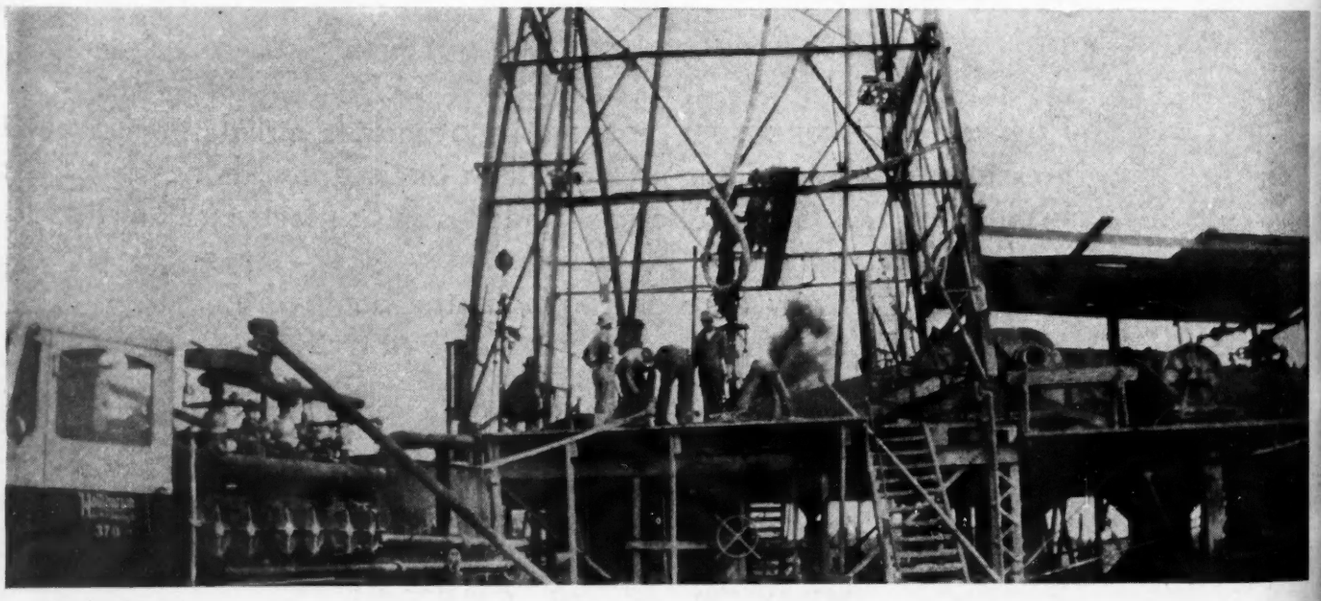
Continental Oil Company encountered what is believed to be the highest indicated bottom-hole pressure ever developed, when in December, 1936, Hebert 1, wildcat test near Abbeville, Vermilion Parish, Louisiana, was drilled to 12,216 feet. A full 17-pound mud was required to keep this well under control. The indicated bottom-hole pressure was above 8000 pounds per square inch. The mud pressure against the formation was the highest ever developed.

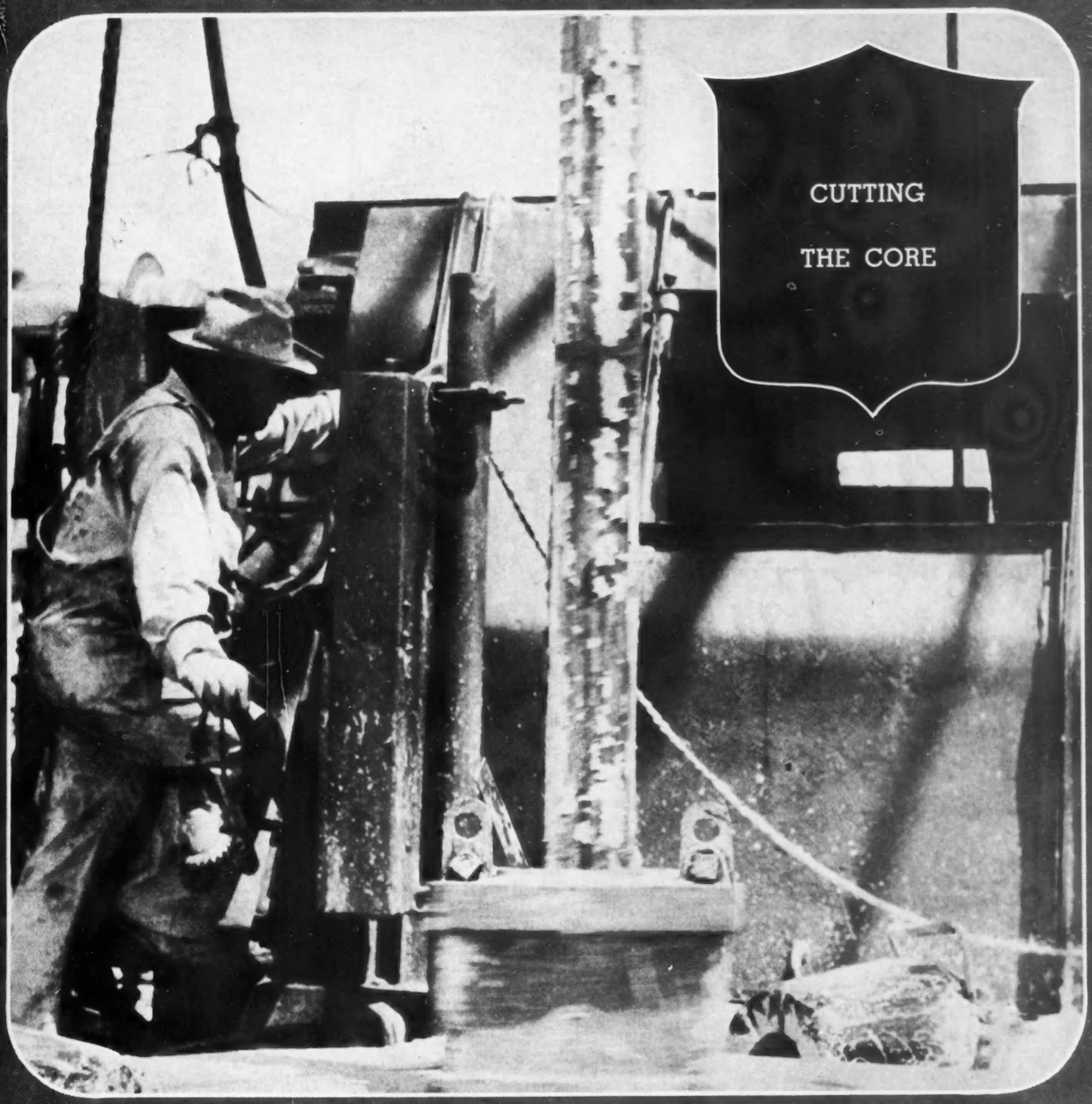
The recent completion of Humble Oil & Refining Company's Ellender 1 at 11,630 feet, a new record producer located in Terrebonne Parish, Louisiana, was a tribute to pressure-control methods of today. Although an accurate bottom-hole pressure was not obtained, the shut-in pressure was 5000 pounds per square inch. Completion of this well was one of the year's achievements.

Control of high formation pressures in the Old Ocean, Texas, field made possible the development of a producing formation between 9000 and 10,200 feet. In this field the pressures were about normal, but the presence of gas necessitated the use of special muds.

As higher pressures are developed, effective methods for their control are found. This phase of operations will not prevent still deeper operations in the principal producing districts of the United States.

Angelo Candelari 1 was brought under control after abnormal pressures were developed.





THE TIME REQUIRED FOR CUTTING THE CORE varies, of course, with the formations. Here, it took from eight to ten minutes. Pressure lofts to 900 pounds . . . SIGNAL! The Core Tube is filled with core and is ready to be retrieved.

Precision is inherent in the Signalling Core Barrel. It measures the core length automatically, regardless of drill pipe elasticity. The Universal Core Catcher brings up softest to hardest cores.

UNITED STATES
HEAT TREATING COMPANY, INC.
SAN ANTONIO, TEXAS

Abuses in Handling Tubular Goods[1]

IMPROPER methods of handling pipe from the mill to the consumer, and in its field use, are given along with details of the resulting damage. Detailed suggestions are presented regarding loading, unloading, field handling by truck, and protection of threads against sand and grit. The article was presented before the American Petroleum Institute, Division of Production, Mid-Year meeting at Colorado Springs, June 3, but because of its thorough coverage of the subject has been made a part of our "Equipment Care Series."

By L. R. SMITH,
Tide Water Associated Oil Company

OIL-COUNTRY tubular goods have been abused so much in handling as to render of prime importance an immediate improvement in handling practices—which, if adopted, will effect a vast saving to the petroleum industry. In furthering this interest, this paper is designed to present and illustrate the wrong methods employed, with resulting damage to pipe, rather than to lay down rules to be followed to accomplish good results—the published recommendations of the American Petroleum Institute *Code No. 5: "Recommended Field Practice for the Care and Use of Oil-Country Tubular Goods,"* dated July 1929, together with proposed revisions pending at the present time, in this regard being sufficient.

Loading and Unloading and in Transit

Improper handling of tubular goods may rightly be covered under three heads: transportation, storage, and use. In the first two, both supplier and consumer are involved; in the third only the user is responsible.

The abuse in handling tubular goods begins at the mills. In the loading and unloading of cars and ships, due care is not exercised to avoid damage to the threads or to the body of the pipe. There is, however, as we all know, a marked improvement as compared to conditions a few years ago.

The threads of oil-country tubular goods are made to very close tolerances, the taper variation permitted being +0.0052 inch and —0.0026 inch per inch; and the American Petroleum Institute is considering the adoption of a pitch tolerance of ±0.002 inch per inch. To insure a tight joint, it is also required that threads have full accurate form and height. It can be readily seen, therefore, that a very moderate blow on the threaded portion will result in a distortion of the thread to an extent greater than the variation allowed.

Thread protectors are a necessary adjunct to the preservation of undamaged threads; however, experience shows that the threads can easily become damaged with the protector in position.

In the loading of railroad cars, spacers or bracing are at times carelessly placed. Under such condition the load may shift longitudinally, allowing the end of the

[1]Fourth of a series of "Equipment Care" articles.

RAPIDITY DUE TO CIRCULATING PRESSURE SIGNALLING. No delays for landing Core Tube. No delays for circulating. The Wire Line Type Signalling Core Barrel has recovered one nine-foot core from below 6,000 feet for each 21 minutes elapsed time.

Completely satisfactory Core Drilling or no service charge will be made for the Core Barrel

UNITED STATES
HEAT TREATING COMPANY, INC.
SAN ANTONIO, TEXAS

pipe to strike or rub against the end of the car, or even reach the next car, with serious damage to the threads. Such a shifting of the load will throw the spacing strips out of place, and result in bends and kinks due to the eccentric load imposed on the lower layers of pipe.

In the use of hooks, more commonly employed for unloading, frequent damage occurs to the threads. Even with thread protectors in place, this is possible through careless handling or with improperly-designed hooks—particularly in the event the hooked end should strike a solid object. In the *Institute's Code No. 5* above referred to, you will note that particular importance is attached to the shape of unloading hooks, and a design is recommended which will not bear upon the threads of the couplings. Figure 1, in the upper cut, illustrates improperly-designed hooks which will scar the coupling threads with galling as a result when joints are made up. In the lower cut, hooks of recommended design are shown.

In transit, thread protectors will run off through vibration; and, at times, careless workmen will unload the pipe before the protectors are recovered from the bottom of the car and replaced. Under such conditions damaged threads are almost a certainty. A type of tubing protector fitted with a wire-spring retainer is in use by some suppliers. This protector does not readily become dislodged, and probably should be more extensively adopted.

Water Shipments

In water shipments from the mill, it sometimes occurs that due care is not exercised in placing the dunnage strips exactly one above the other to separate the tubular layers and, in bracing, to prevent shifting during the lurching of the ship. Unless these precautions are taken, damage will more than likely result and the cargo require considerable repair work or be partly subject to rejection.

During unloading from the hold of the ship, it is frequently required that the lengths of pipe be dragged along the pile, lifted through the hatch in a semivertical position, and set down end first on the wharf or in a gondola car. The couplings or thread protectors may hook together or strike the edge of the hatch opening. The pipe may be dropped upon the deck or be bumped against the ship's rail or contact the side of the car, and

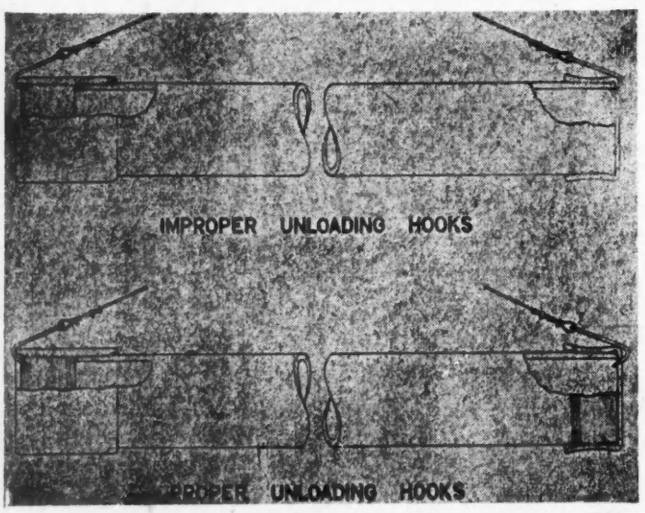


FIGURE 1
Unloading Hooks.

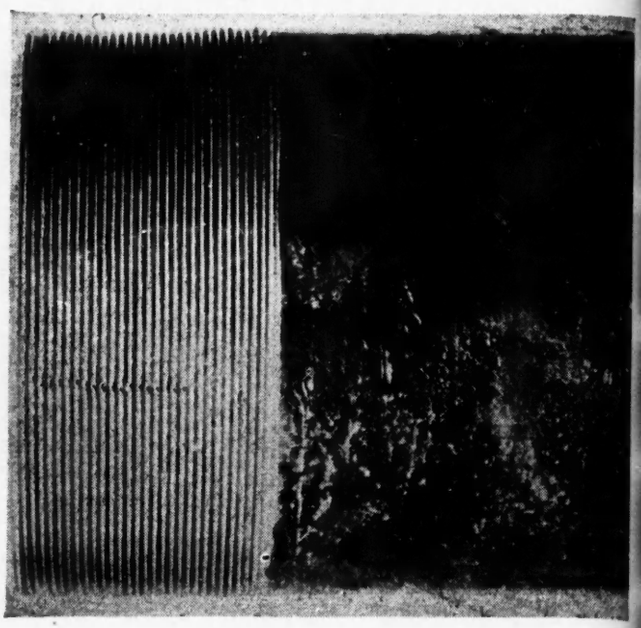


FIGURE 2
Damage to Unprotected Threads.

in every way suffer abuse. With this in mind, a supplier's agent, and perhaps a representative of the consumer, should be on hand at the dock to observe unloading operations and demand proper hanling.

Motor Shipments

In the motor trucking or handling of tubular goods to the final destination, there is as much chance for damage as at other points along the line—although conditions have improved materially in recent years. This improvement is principally due to education, the use of more adquate equipment, and to the smoother operation of the pneumatic-tired vehicles. Yet here also serious damage is sure to occur unless proper methods of loading and unloading are observed.

In placing the pipe on truck or trailer the usual precautions must be taken in the location of the spacing strips, and the load must be securely lashed to prevent slipping. It is also important that a dolly be used in case the truck is not of sufficient wheel base properly to support the length of the pipe joints. Instances have been observed where serious damage has resulted from the dragging of the ends of pipe under these circumstances.

When the pipe is unloaded in the field, it is common practice, if the truck or trailer bed is higher than the rack, to cut the load loose so that joints will roll. This is a very unwise proceeding, as the labor saved by this method at the outset is more than offset by the grief experienced later on. The terrific bumping given to the couplings and to the thread protectors as the joints strike one another results in battered threads, which, although at times almost unnoticeable, becomes manifest through galled threads and washouts. This mass method, so to speak, of unloading tubing in particular results in many dislodged protectors. As the tubing rolls down the skids, the rolling action against adjacent joints runs off many of the protectors, leaving the threads open to damage. Figure 2 shows damage resulting after removal of protector. Figure 3 illustrates how

TEN FEET OF CORE . . . 112% recovery. Two minutes later another Core Tube was dropped for another core.

Pennington Signalling Core Barrels are made in the following types: Wire Line, Circulating, and Conventional, fitting all sizes of drill pipe from 2⅞" to 6⅝". "Double" Core Drilling units. Plug Bits, for Core Drilling, or straight holing in full bore hole without pulling the drill pipe.

"CONTINUOUS CORE DRILLING," booklet No. 3, is on the press. Ask for your copy

UNITED STATES
HEAT TREATING COMPANY, INC.
SAN ANTONIO, TEXAS

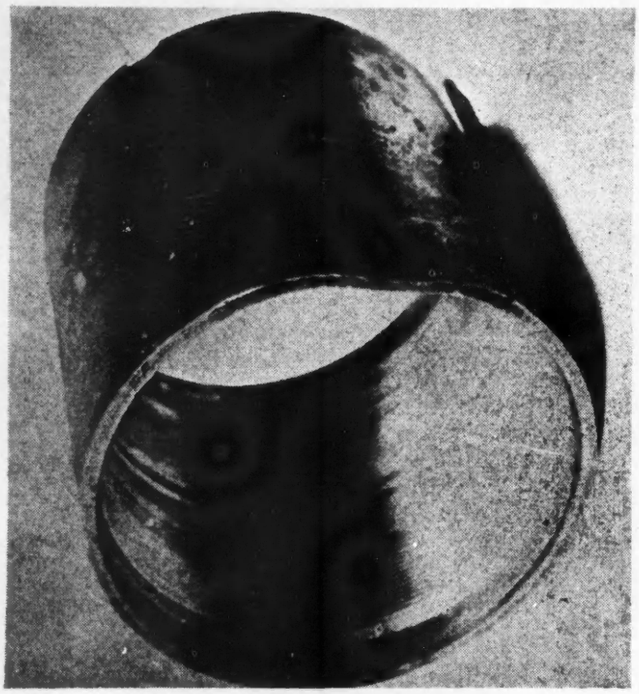


FIGURE 3
Distorted Coupling.

badly a coupling can become distorted by a sidewise blow.

Occasionally during unloading operations, a joint of pipe is dropped, usually through carelessness, although sometimes intentionally. Such rough handling results in bends and dinges which destroy its perfect roundness, so essential to resistance to collapse. At the same time skid timbers or other objects carelessly rolled or dropped upon the pipe will cause untold damage.

Storage

When it comes to the storage of tubular goods, both user and supplier may be subject to criticism. It goes without saying that here, also, the proper placing of spacing strips directly above the stringers of the rack is of prime importance. Pipe should never be piled directly on the ground; for not only will drifting sand and moisture damage the lower tiers, but a settling at the load points directly under spacing strips will bend and likely put permanent sets in some of the joints next to the ground. Figure 4 shows pipe which has been mistreated in this way. Two lengths of pipe in this picture have apparently been dropped as well.

As a rule, pipe is stored in the open, and it is essential, then, that steps be taken to protect the stock against the weather. There are many recommended rust inhibitives, and a light spray coat properly applied will ward off the ill effects of rain and atmospheric moistures. Failure in this respect may result in excessive corrosion, which is often disregarded until in its advanced stages.

Protection against sand and grit should not be neglected. In sandy districts, or where dust storms are prevalent, there will be an accumulation of dirt and sand inside the pipe unless the ends are covered. This foreign matter will work into the threads underneath the protectors, and scratching and scarring of the threads will result when the protectors are removed. Such an accumulation inside the pipe will also hold moisture and induce corrosion, particularly in the coupling threads.

One mistake made occasionally in the storage of pipe is the failure properly to mark each shipment for subsequent identification. From such oversights, whether intentional or otherwise, pipe failures result which are extremely expensive. In a recent failure in a string of 5-9/16-inch drill pipe a number of singles, including the collapsed joint, were found to be 19.00-pound grade "C," whereas the tool record showed the string to be entirely 22.20-pound grade "D." No doubt the pipe became mixed in some storage yard.

It is false economy for either supplier or consumer to lay in too great a stock of tubular goods. Often, in anticipation of price advance or for some other reason, this is done; but a careful check will show considerable damage to the pipe from too long a storage. Likewise, the saving in first cost will no doubt be largely eaten up by personal-property taxes and reconditioning expense.

USE

Running the Pipe

When it comes to running the pipe, the industry really should be complimented for the marked improvement over a few years ago. On the other hand, casual observance will disclose a great deal of abuse which should be eliminated.

As regards drill pipe, careful study indicates that

FIGURE 4
Improper Storage.

40 MILES OF HOLE with FLUID-PISTON pumps at 1 1/10c per foot MAINTENANCE COST!

MILLS BENNETT PRODUCTION COMPANY
GULF BUILDING
HOUSTON, TEXAS

January 29, 1937.

ADDRESS ALL COMMUNICATIONS TO THE COMPANY

Abercrombie Pump Company,
2105 Gulf Building,
Houston, T e x a s.

Attention: Mr. J. A. Tennant, Vice-President.

Gentlemen:

In answer to your request concerning our pump operating costs since we have been using your FLUID-PISTON Slush Pumps, we are giving you these costs in summarized form herewith:

We have drilled forty-eight (48) wells, a total of 217,812 feet of hole, at a total expense for pump repairs of one and one-tenth cents (1-1/10¢) per foot of hole drilled.

The above cost includes twenty-eight (28) days workover service on our J. B. Means #4-A, twenty-one(21) days of which were fighting heaving shale. No footage is included in the above total for this workover.

On the first three wells completed by us using your pump, the pump was in continuous service two hundred six (206) days to complete 15,607 feet of hole, much of the drilling being in heaving shale. In spite of this long service for such low footage, the total cost per foot over the almost three years we have been using FLUID-PISTON pumps still figures out only a fraction over one cent (1¢) per foot drilled.

Your pump is a radical departure from the conventional type, and on that account it is necessary for the drilling crews to thoroughly understand its operation and construction and to give it the routine attention which it requires.

Yours very truly,

MILLS BENNETT PRODUCTION COMPANY

H. R. Bennett

H. R. Bennett
Vice-President

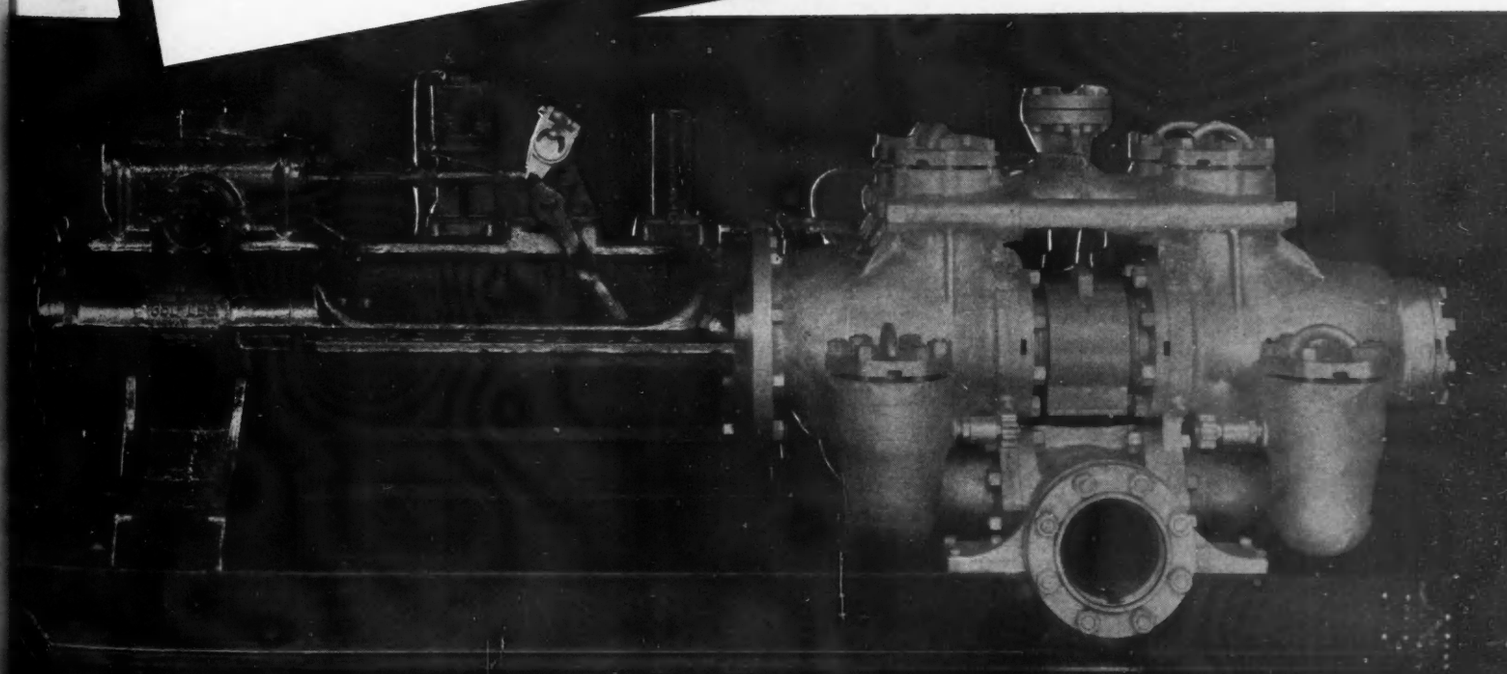
1-1/10c per foot pump maintenance cost on 40 miles of well bore!

This carefully calculated figure, provided us by Mills Bennett Production Company, furnishes a striking basis for comparison between the operating cost of the Abercrombie FLUID-PISTON PUMP and the pumps you are now using. No better test can be expected of any product . . . yet similar results are common among FLUID-PISTON PUMP users.

There are logical reasons for such dependable low cost operations: Moving parts do not touch abrasive-laden mud. Plungers and rods are packed against clear water only, permitting the use of simple pressure-tight packing on which adjustments are seldom necessary. Internal pump friction of moving parts is minimized. There is no fluid slippage, the volume discharged per stroke remaining constant at new pump value indefinitely. The FLUID-PISTON Pump is built of cast steel, with interchangeable sections, and is designed for continuous operation at pressures up to 3000 pounds per square inch.

FLUID-PISTON SLUSH PUMPS
ABERCROMBIE PUMP CO.
GULF BLDG. HOUSTON TEX.

Call or write for your copy of the FLUID-PISTON PUMP Catalog which gives full details of design, construction and operation.



the majority of drill-pipe failures come as a result of poorly made-up strings. Installing tool joints in the field should be out of the question. Too often this is done, and the force applied is a matter of guess work.

In the first place, the tool joints should be carefully selected for size, and the threads checked for pitch and taper. Then, by all means, the threads should be thoroughly cleaned, and a zinc dust lubricant applied before screwing up. A satisfactory lubricant should have a zinc content of 55 percent, and should be used in its prepared state. It is a mistake to thin the paste with oil. To do so will reduce its efficiency, and metal-to-metal contact will result as the oil is dissipated, with ultimate galling when joint is broken.

Tool-Joint Failures

Setting up the tool joints from the hand-tight position without an accurate means of measuring the torque is now recognized as one of the principal sources of joint failure. Machine shops have been progressive in realizing the needs of the oil operators, and there are at present few localities where machines for handling this service are not available. In the final buck-up of the joints, a rotation of approximately 3 r.p.m. is recommended, and, with the latest machine for the purpose, it is possible to shift from high to low speed without stopping. In the older-type machines, where it is necessary to stop to shift gears, galling sometimes results because of shrinkage due to loss of generated heat.

Torque

Figure 5 is a photograph of a highly satisfactory make-and-break machine available at a Ventura (California) shop. Note the hydraulic gage, with carriage mounted on rails to give longitudinal adjustment while maintaining a constant torque arm. With the two long levers at the top of the machine, it is possible for the operator to shift into low gear coincident with the disengaging of the high. For use with this equipment, a table has been compiled which shows the gage reading corresponding to force predetermined as satisfactory for each size of drill pipe.

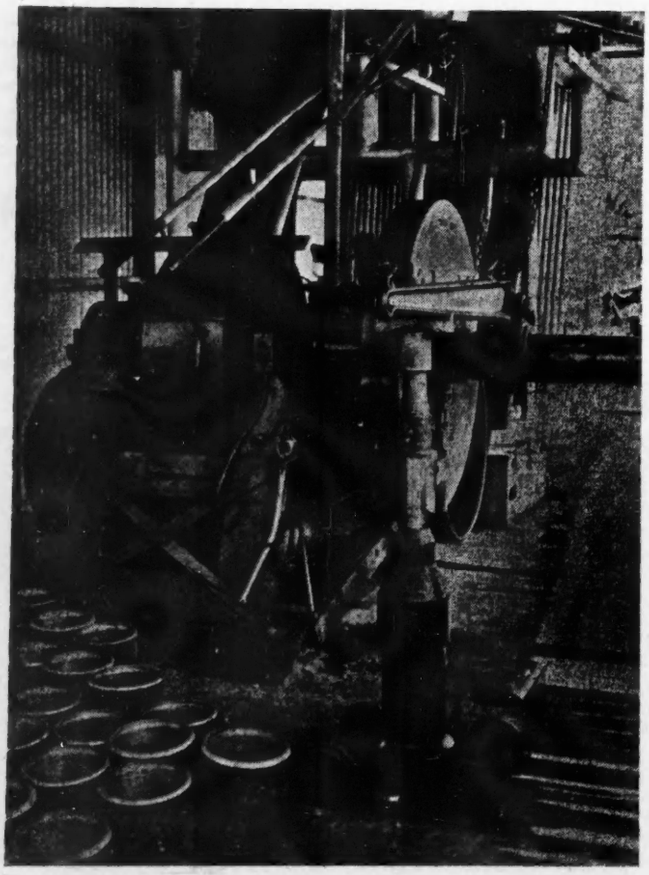


FIGURE 5
"Make-and-Break" Machine.

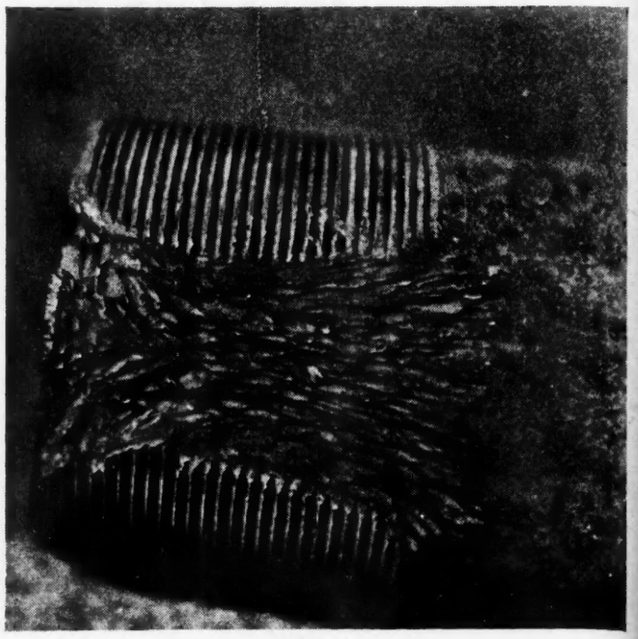


FIGURE 6
Washout, Drill-Pipe Threads.

TABLE 1
Torque Table

Size and Weight of Grade "D" Drill Pipe		Foot-Pounds of Torque	
Outside Diameter (Inches)	(Pounds)	Tool Joint	Coupling
2⅜	6.65	3,500	2,500
2⅞	10.40	4,500	3,200
3½	13.30	7.000	4,700
4½	16.60	9,500	6,300
5⅛	22.20	12,000	8,000
6⅝	25.20	15,000	10,000

Table 1 shows figures which are reasonably correct for the foot-pounds of torque necessary to make up various sizes of grade "D" drill pipe. Note that the tool joint requires approximately 50 percent more force than does the coupling.

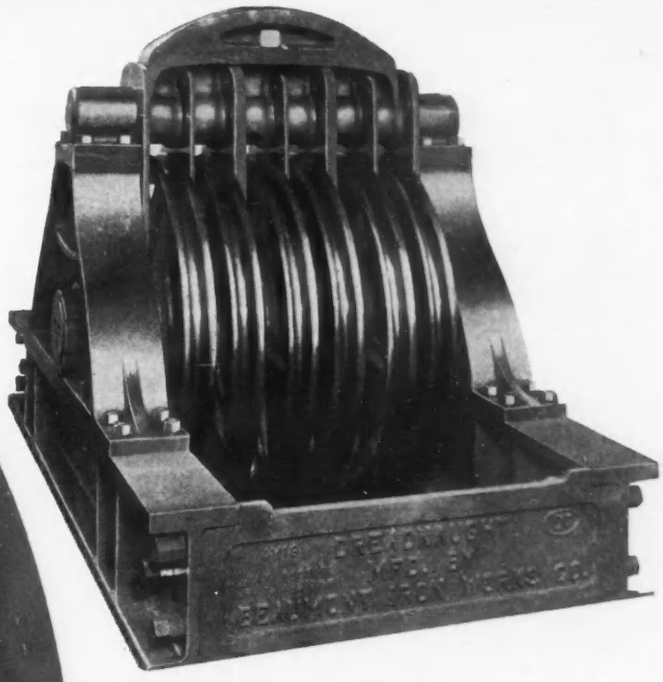
Drill-Pipe Failures

A good illustration of a drill-pipe washout resulting from a sloppy make-up is shown in Figure 6. With proper application of the tool joint, such a failure might have been avoided.

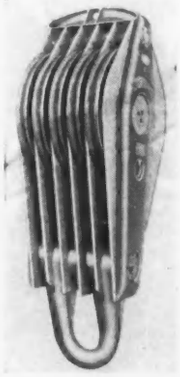
Considerable grief is at times meted out to the drill pipe when it is dragged into the derrick and run into the hole. A careless crew will allow the joints to strike the edge of the rotary table, or the driller may use slambang methods in stabbing. Much of such abuse can be avoided, and the tool pusher should see

Designed and built for deep drilling. Approved by many of the most successful operators in deep production fields.

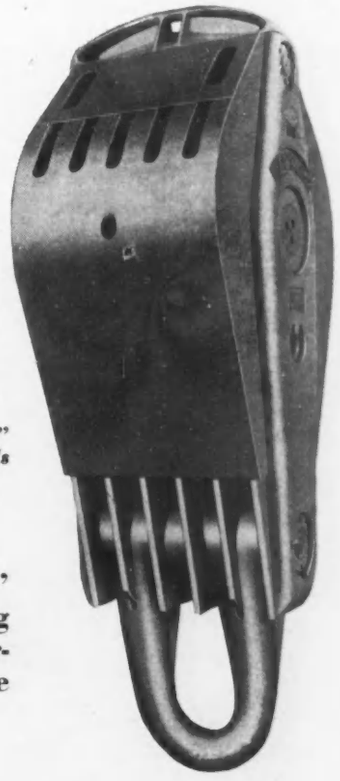
Ask for interesting literature on this matched DREADNAUGHT trio



The DREADNAUGHT Type "KY" Straight Line Crown Block is built with either 5 or 6 sheaves. 300 to 360 tons capacity. Slow-wearing manganese-molybdenum steel sheaves and special Hyatt roller bearings. A sweet-running piece of equipment.



This small illustration shows the "PY" Traveling Block with safety guards removed.



The DREADNAUGHT Type "PY" Traveling Block. Five slow-wearing sheaves. 300-ton capacity. Hyatt bearings. True-running design. A prime favorite with hustling crews.

PLY CORPORATION

TULSA, OKLA.

to it that the drilling crews observe instructions issued.

Many drill-pipe fatigue cracks with washouts have their inception from slip cuts, and too often the operator does not realize the ultimate damage which may result from apparently insignificant abrasions on the outer wall of the pipe. Figures 7 and 8 are very good examples of what may take place. Washouts of this nature are of frequent occurrence. If oil men would but come to a realization of the importance of using properly-designed slips with small serrations, failures of this nature would largely be eliminated.

Occasionally an inadequate blowout preventer will prove destructive to the drilling string. Figure 9 shows severe washing where the preventer failed against high pressure.

Casing Failure

The welding of casing strings has eliminated much of the trouble formerly experienced with casing in the hole. However, it is well to call attention to the common abuses in running the screwed pipe.

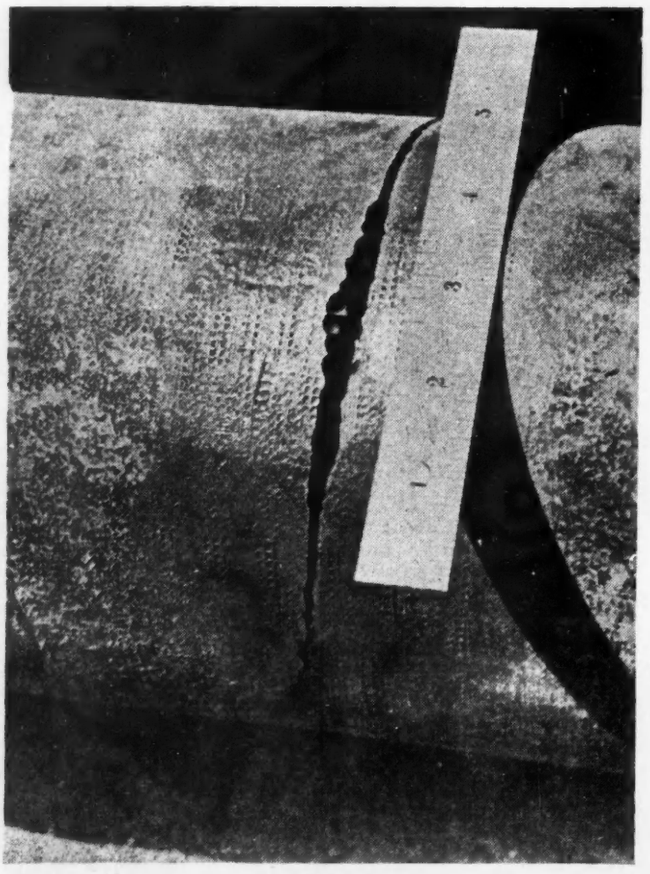


FIGURE 7
Washout from Slip Cuts.

Only elevators in first-class condition should be used—the slip-type being recommended for all long strings. Where the latch-type are employed, a careful inspection should be made of the bearing surface to check for uneven wear. Many times elevators in poor condition are used which shift the load to one side of the coupling, with danger of jumping it off. Figure 10 shows worn elevators badly in need of reconditioning.

Failure to observe the usual care in checking, cleaning, and lubricating the casing and coupling threads will result in inefficient joints. In dragging into the derrick without the use of the dolly, the protectors will pick up splinters and grit which, if

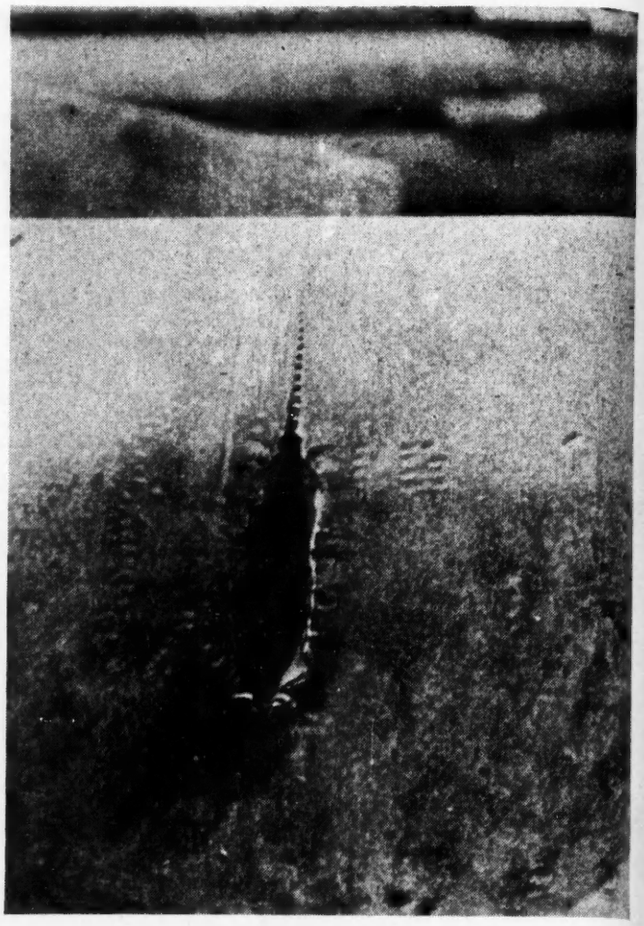


FIGURE 8
Washout from Slip Cuts.

FIGURE 9
Washing Under Blowout Preventer.

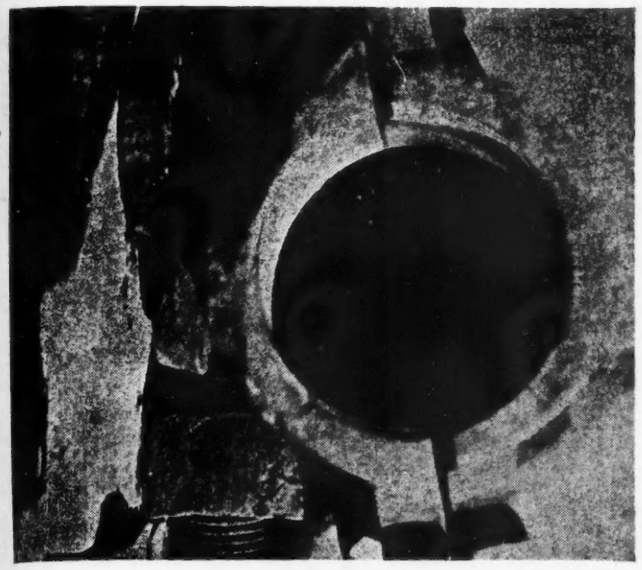


FIGURE 10
Worn Elevator.

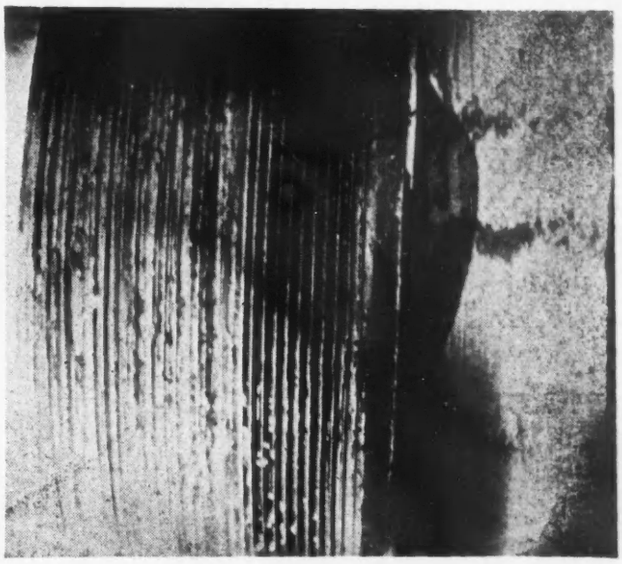


FIGURE 12
Galled Casing Threads.

not carefully removed, will injure the threads. Handling without protectors will, without question, result in damage. Too often the members of the crew are careless, and allow the casing to strike against the rotary table. In such cases, careful inspection upon removal of protectors will likely disclose battered threads. Figure 11 shows casing threads which were screwed up without any consideration being given to cleaning. Such flagrant abuse is entirely uncalled for, and should draw a severe reprimand. Figure 12 is an illustration of very bad galling as a result of improper lubrication. Figure 13 shows flat-

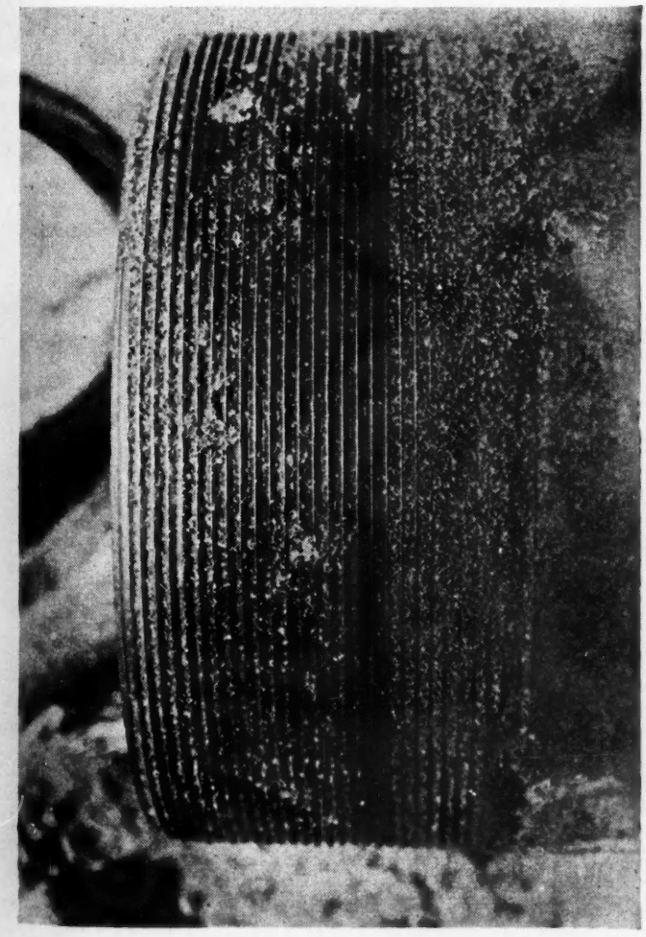
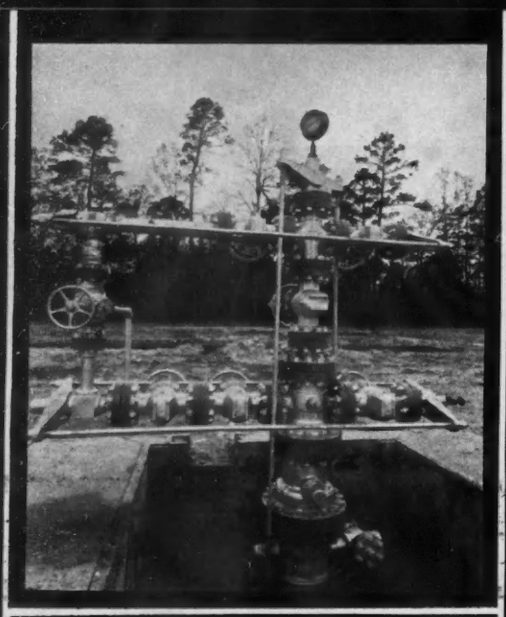
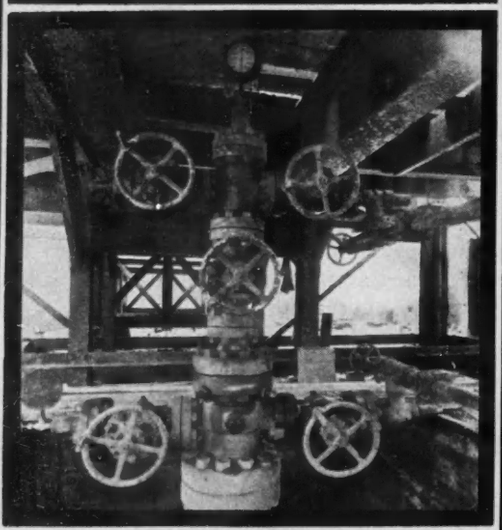
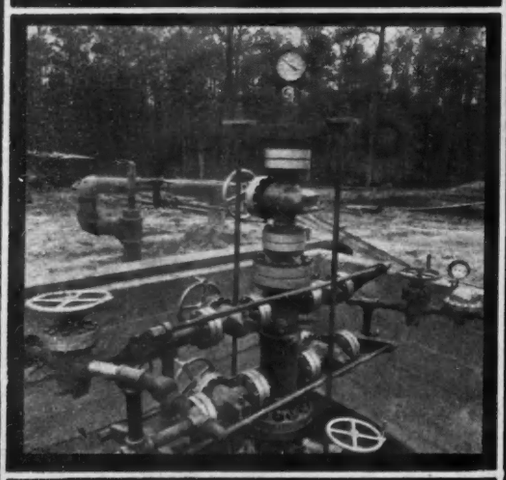


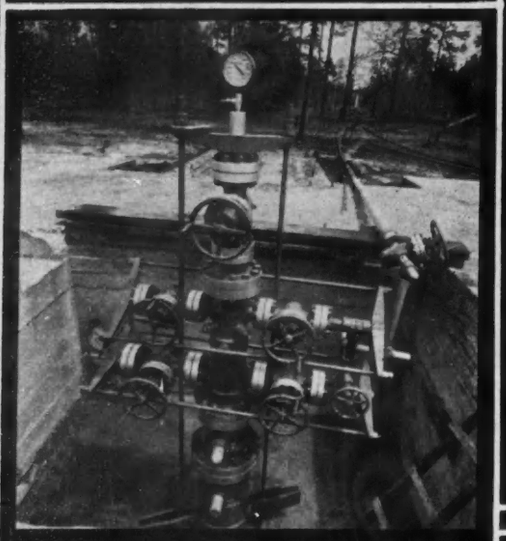
FIGURE 11
Dirty Casing Threads.

FIGURE 13
Threads Flattened and Galled.



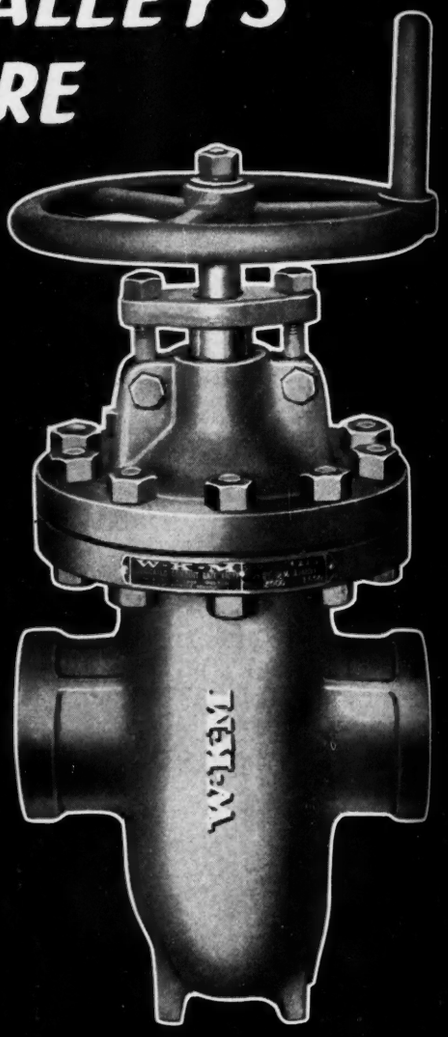






85% OF THE GATE VALVES IN COTTON VALLEY'S DEEP PAY ARE

W·K·M



COSTS NO MORE THAN ORDINARY VALVES

Sold Through Supply Stores Everywhere

The preference for W-K-M Gate Valves in the deep, high pressure Cotton Valley, Louisiana, field to the extent of 6 to 1 over all other gate valves is no exceptional case. You'll find this, or higher, standing in numerous other important fields today because this, the outstanding achievement in valve design, is definitely out-performing any and all other gate valves beyond reasonable comparison.

It's different!

W-K-M Company, Inc.

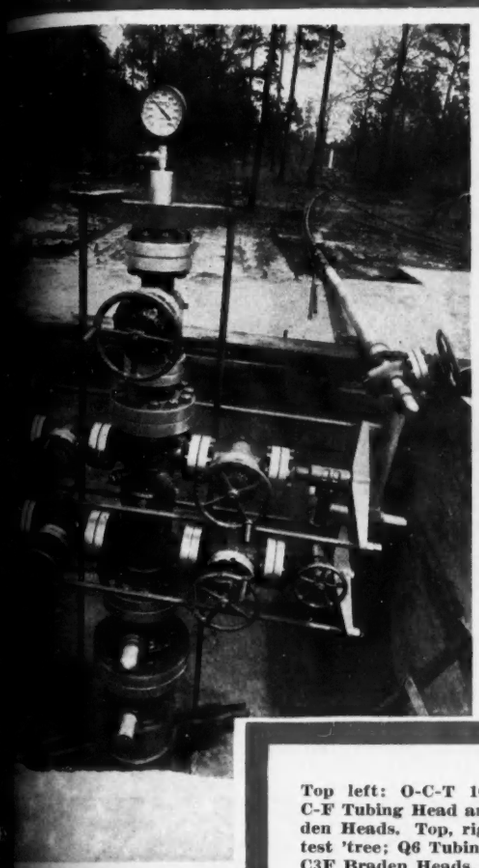
OIL FIELD, PIPE-LINE & INDUSTRIAL EQUIPMENT

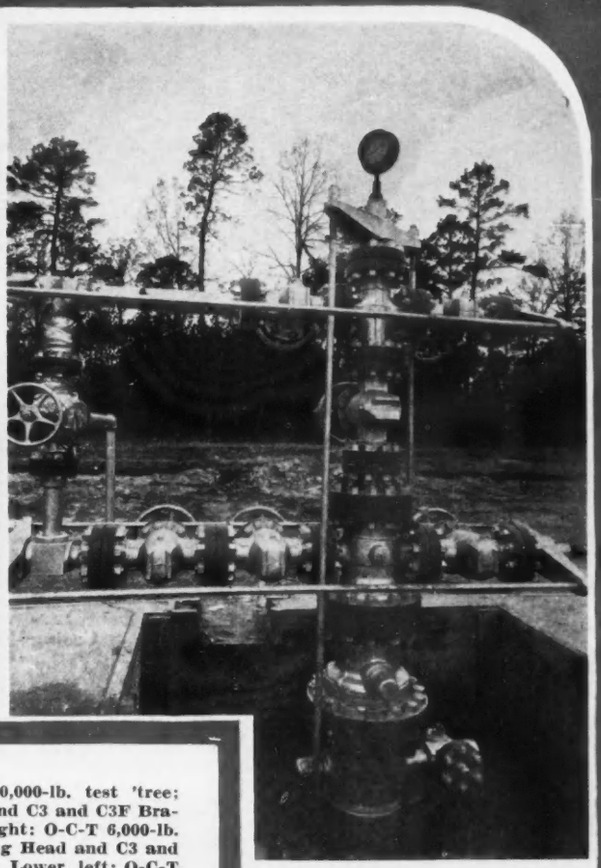
HOUSTON, Texas, U. S. A.

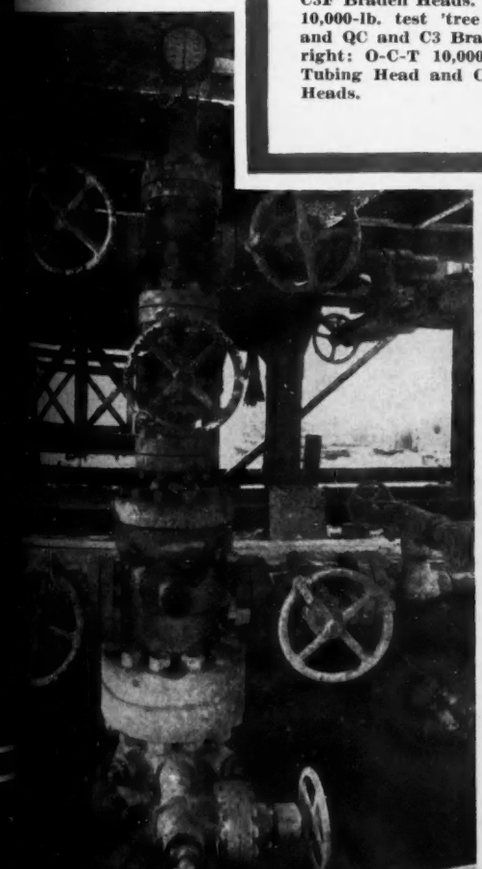
Export Office: 74 Trinity Place, New York

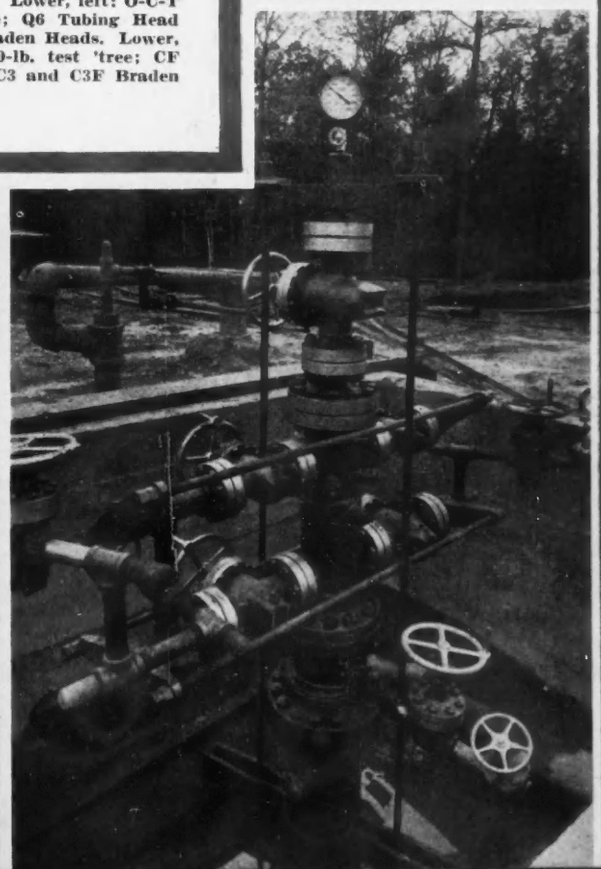
Cable Address: "WILKOMAC"

When the industry demanded 10,000# TEST PRESSURE EQUIPMENT, O-C-T was first to provide it — at Cotton Valley, for example









Top left: O-C-T 10,000-lb. test 'tree; C-F Tubing Head and C3 and C3F Braden Heads. Top, right: O-C-T 6,000-lb. test 'tree; Q6 Tubing Head and C3 and C3F Braden Heads. Lower, left: O-C-T 10,000-lb. test 'tree; Q6 Tubing Head and QC and C3 Braden Heads. Lower, right: O-C-T 10,000-lb. test 'tree; CF Tubing Head and C3 and C3F Braden Heads.

» The deep Cotton Valley, Louisiana, field is a good one, and Cotton Valley operators are using good production equipment. Take the Christmas-tree hook-ups, for example. Out of seven wells producing from the deep pay, six of them are producing through O-C-T Assembled and Tested 'trees. And, incidentally, the class of safety provided by O-C-T Control Equipment is necessary for Cotton Valley deep pay. Depths run as much as 8,600 feet . . . pressures as high as 3,600 pounds.

» Note, at left, the O-C-T Tubing Head—Braden Head combinations employed on the four Cotton Valley wells pictured. O-C-T Tubing Heads used in these 'trees permit the drilling in, running, and landing of tubing through blow-out preventer equipment, either flanged or screwed. They also permit the lowering or raising of tubing against pressure, without killing the well. They are manufactured under U. S. Patents No. 2016454 and No. 2045579.

» For complete details refer to the Tubing Head—Braden Head Section of the New O-C-T Catalog No. 37, just off the press.

OIL CENTER TOOL CO.

O-C-T

HOUSTON, TEXAS, U.S.A.

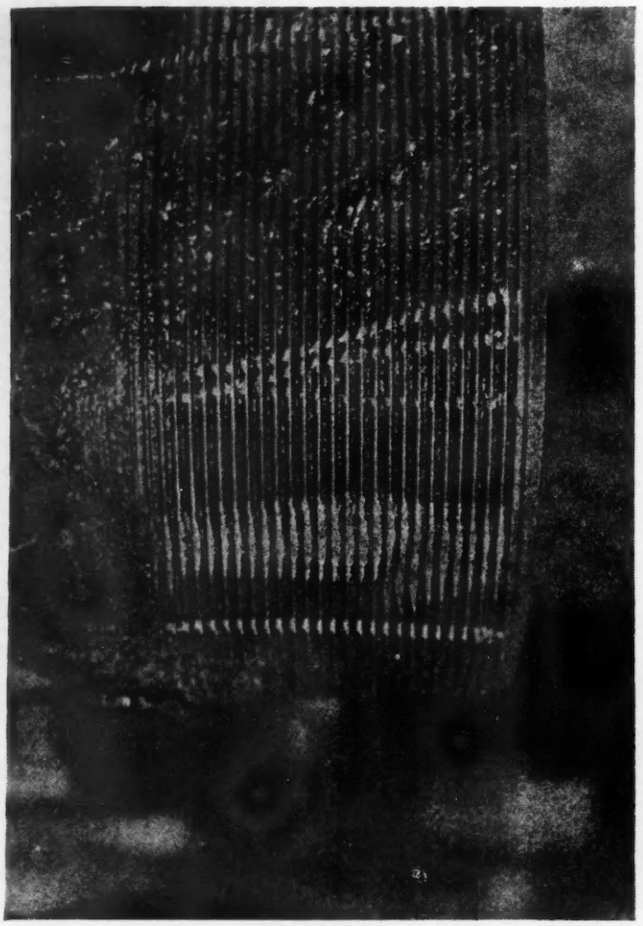


FIGURE 14
Threads Gouged and Scratched.

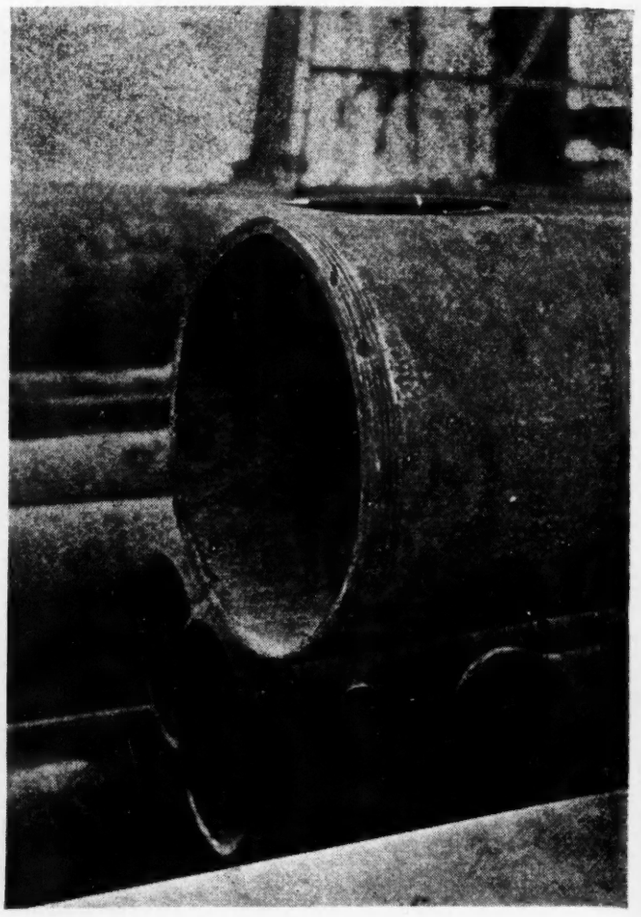


FIGURE 15
Casing Failure—Last-engaged Thread.

tened threads which galled upon being unscrewed. Figure 14 shows what can happen to the threads when casing is handled without thread protectors. It would be impractical to use this piece of pipe again without re-cutting the threads.

Rough stabbing is responsible for much casing trouble. The driller, in his desire to save time, too often does not take sufficient care to avoid damage to pipe or coupling threads. If the end of the pipe is allowed to strike the coupling, if the pipe is dropped into place or is allowed to tilt, the thread form will in all probability be impaired. In such cases, the joint

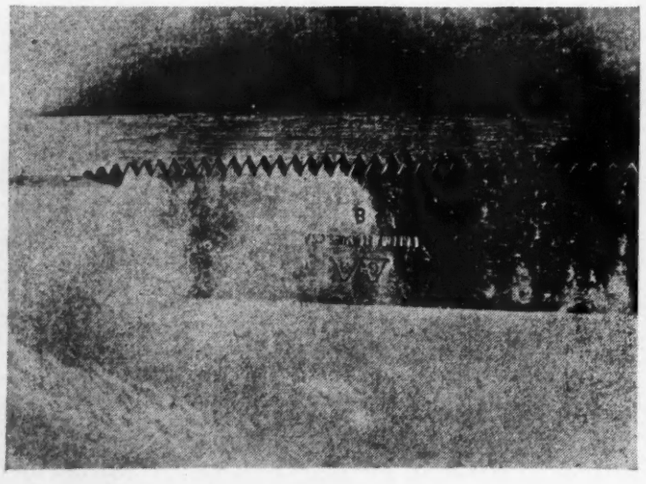


FIGURE 16
Stretched Threads.

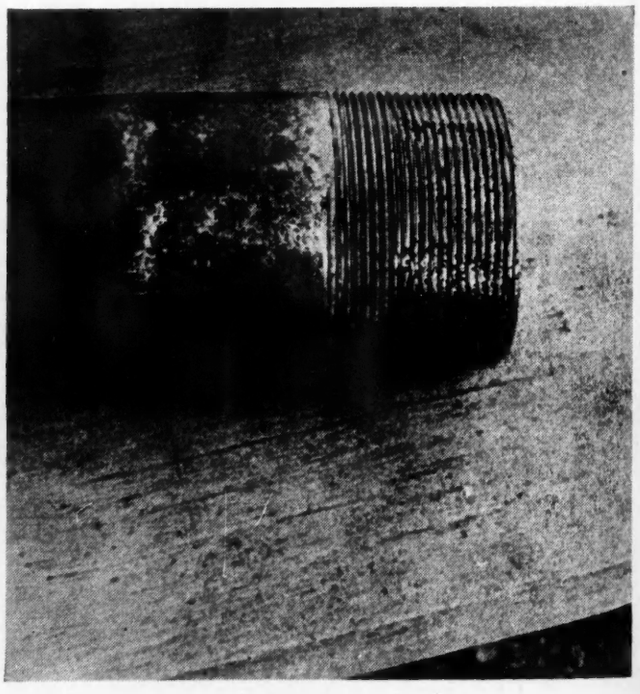


FIGURE 18
Tubing-Thread Washout.

should be lifted for inspection and possible reconditioning before screwing up; otherwise a leaky joint may result. The saving of time in running of pipe is important, but it must be coupled with care and intelligence for ultimate economy.

Taking the stretch out of a landed string is undoubtedly a hit-and-miss proposition with most operators. Figure 15 shows a type of failure which has come about by reason of either too great or too little tension on the string. It has been determined that the stretch imposed should be approximately two-thirds of that which would normally occur if the string were suspended in free air. This is readily calculable, or is available in chart form as included in various handbooks. In common field practice, it is practical to depend on the weight indicator—using a reading corresponding to two-thirds the weight of the string itself.

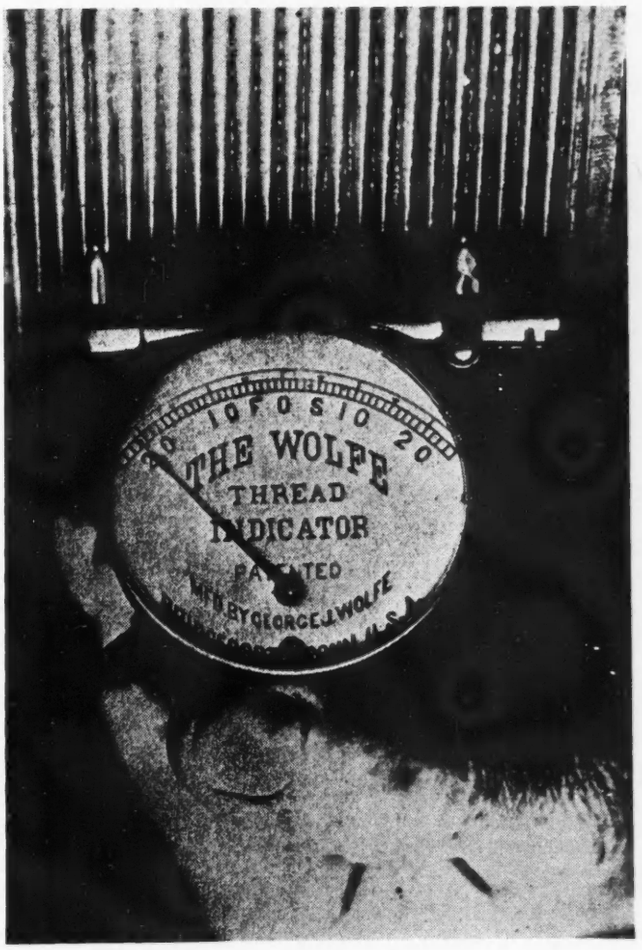


FIGURE 17
Gage on Stretched Threads.

Too much pull on either casing or tubing strings will cause the threads to nick down and elongate. Threads so stretched are no longer fit for use, although they do not appear damaged. Figures 16 and 17 show how badly threads can become stretched by too much tension. The gage in one case shows the threads 0.021 inch long in 2 inches.

Oil-well tubing is probably the most abused type of tubular goods due to its lightness, continuous vibration while in use, and repeated handling. The most common seat of failure in tubing is the joint, which must be absolutely tight to insure all available production reaching the surface.

Here, again, it is essential that the threads be true to form, and within the tolerances specified. Threads cut in field shops are often irregular, and should be avoided. A lack of proper cleaning and lubrication will cause galling, with leakage of the joint as a result. Figure 18 is a good example.

One of the most common causes of leaky joints is under-tongings. Too often the well crews are furnished with tongs which are short in the handle, and excessive force is necessary in the final make-up. On the other hand, over-tonging must be avoided as well. Also, tongs of recommended design should be employed. Chain tongs and pipe wrenches, which tend to crush the tubing, should be discarded.

Summary

On the whole, there is still a great deal of room for improvement in the methods employed in the handling of tubular products, both by manufacturer and consumer. To the best interests of all concerned, it is incumbent upon the suppliers to deliver to the users a product unquestionable as to workmanship and free from damage. Likewise, it behooves each operator in the petroleum industry to endeavor to instill into the minds of employees the importance of using every possible precaution in an effort to reduce the abuse of tubular goods.

Reprints of the foregoing article are available at nominal cost. Write The Gulf Publishing Company Houston, Texas

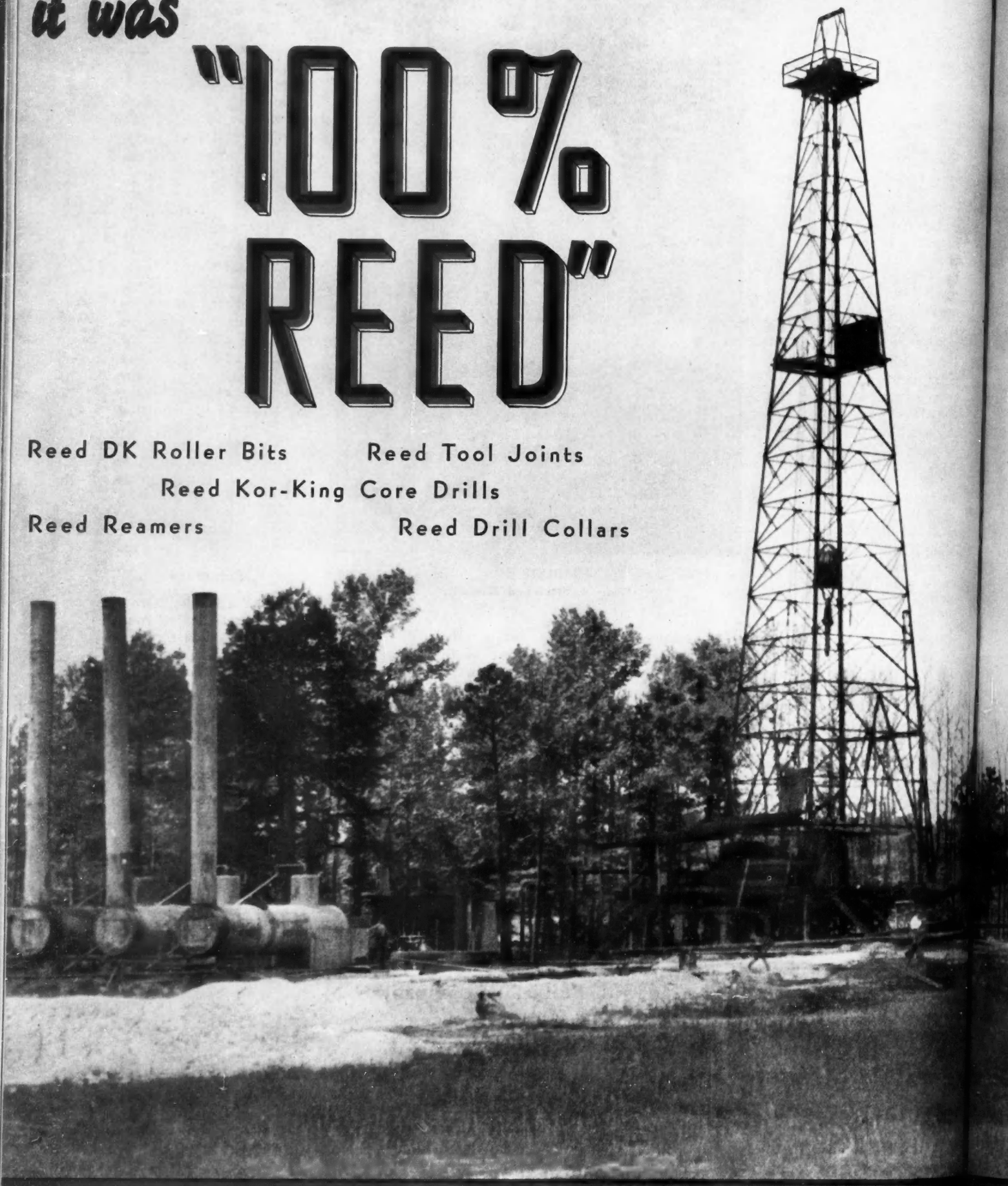
On the Jefferson Discovery Well it was

"100% REED"

Reed DK Roller Bits Reed Tool Joints

Reed Kor-King Core Drills

Reed Reamers Reed Drill Collars



REED ROLLER BIT CO.

LOS ANGELES HOUSTON OKLAHOMA CITY NEW YORK

Distributed through Supply Companies Everywhere

Mid-Continent and Gulf Coast Distributors for MARTIN-DECKER PRODUCTS

the Henderson No. 1, near Jefferson, Texas

REED ROLLER BIT COMPANY
COMPLIMENTS THE

D. THOMASON DRILLING CO.

AND ITS EFFICIENT PERSONNEL
ON DRILLING AND BRINGING IN
THIS IMPORTANT DISCOVERY WELL

•

OUTSTANDING CORING RECORD
WITH THE

REED KOR-KING CORE DRILL

CORING STARTED AT 5,840 FEET
AND WAS CONTINUED TO 6,000 FEET;
THEN INTERMITTENTLY TO 6,408 FEET
WHERE THE PAY WAS LOCATED . . .

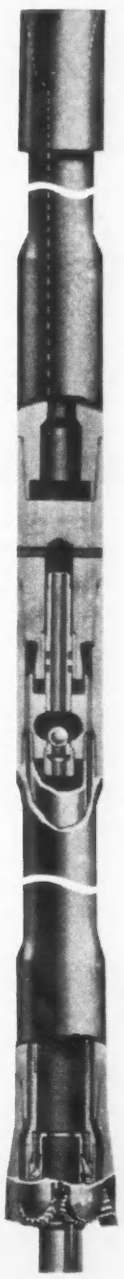
OF THE FIRST 100 FEET CORED
98 FEET, 8 INCHES
WERE RECOVERED

THE TOTAL AVERAGE
CORE RECOVERY
ON THIS WELL WAS

94%

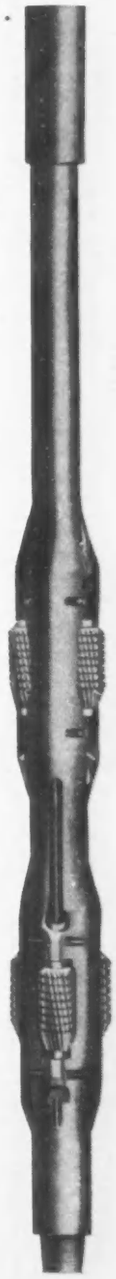
WITH THE
REED KOR-KING
CORE DRILL

"WHEREVER THERE IS ROTARY DRILLING"

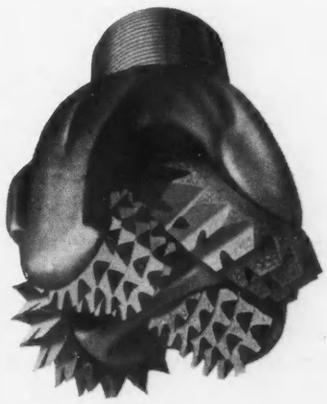


REED
KOR-KING
CORE DRILLS

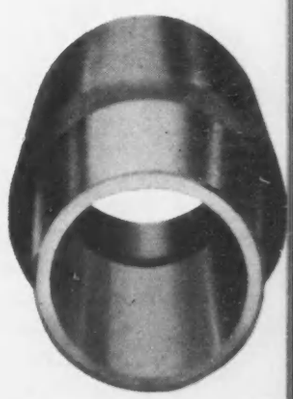
REED
DRILL COLLARS



REED
REAMERS



REED DK
ROLLER BITS



REED
TOOL JOINTS

Micromagnetic Predictions Are Proven By Drill

By W. P. JENNY,
Consulting Geologist and Geophysicist

THE various generally accepted geophysical methods have by no means reached such a state of certainty in their predictions that a new method, yielding additional information, could light-heartedly be overlooked by the oil industry.

The writer has for the past few years advocated accurate magnetic surveys on the Gulf Coast as an additional tool for the location of structure generally and especially of faults.

In a paper on "Micromagnetic Surveys" published in The Oil Weekly on April 27, 1936, a number of micromagnetic surveys were published, and the obstacles and principles of the new method outlined in the following words:

"If the torsion balance of 1925 had measured the gravimetric gradient with an accuracy of only plus or minus 10 Eotvoes, any geophysicist trying to introduce a new and more accurate torsion balance method today would encounter considerable opposition, because from large experience it would be general knowledge by now that while the *torsion balance* gave good results on shallow domes it utterly failed to prove up any of the deep seated domes.

Even if the geophysicist could prove by actual surveys on known deep domes that his new and improved torsion balance method gave very definite gradient pictures above such structures, he would meet with little credulity, because these areas "had all been *torsion balanced* in former years, and not the slightest indication of structure could be discovered."

This opposition, fictive for the torsion balance method, is only too real in the case of the magnetic method, even though, as the result of years of experience, this method has recently been revolutionized in a threefold way:

1. The magnetometer has been greatly improved.

2. The field technique has been improved to such a point that it is now possible to measure the magnetic field with an accuracy of plus or minus 2 gammas as compared with the average accuracy in former years of from plus or minus 10 to plus or minus 25 gammas.

3. The basic assumptions for the interpretation of magnetic anomalies have been changed completely. In former years we thought that all magnetic anomalies were caused by the basement or shallow igneous rocks. Today we know that there exists sufficient difference in the magnetic susceptibility within the sedimentary columns, to produce noticable magnetic anomalies above structures of commercial interest. Especially in the Gulf Coast and in parts of California, where the basement is buried beneath a four to six miles thick blanket of sediments, it stands to reason that any localized magnetic anomaly must of necessity originate within the shallower sediments."

Through the courtesy of D. B. MacDainel, who made the location for White 1, discovery well for the north extension of the Anahuac field, Chambers County, Texas, a plat was included in the paper mentioned above, showing some of the micromagnetic results obtained in this area at a time, when four producing wells existed in the north extension, one other location was made, and Knowles 1 was drilling.

A fault with large displacement was located in the northeast corner of the White tract in the Jas. McGahey Survey. This fault could be followed in a southsoutheasterly direction with decreasing throw and was no more indicated along the Anahuac-Stowell road. Knowles 1, proving the fault, was abandoned during the micromagnetic survey. It was, however, a month after completion of the micromagnetic survey that Knowles 2 came in a flowing well, proving, together with later neighboring wells, the micromagnetic prediction that the fault stopped north of the Anahuac-Stowell road, or crossed this road with only a negligible throw.

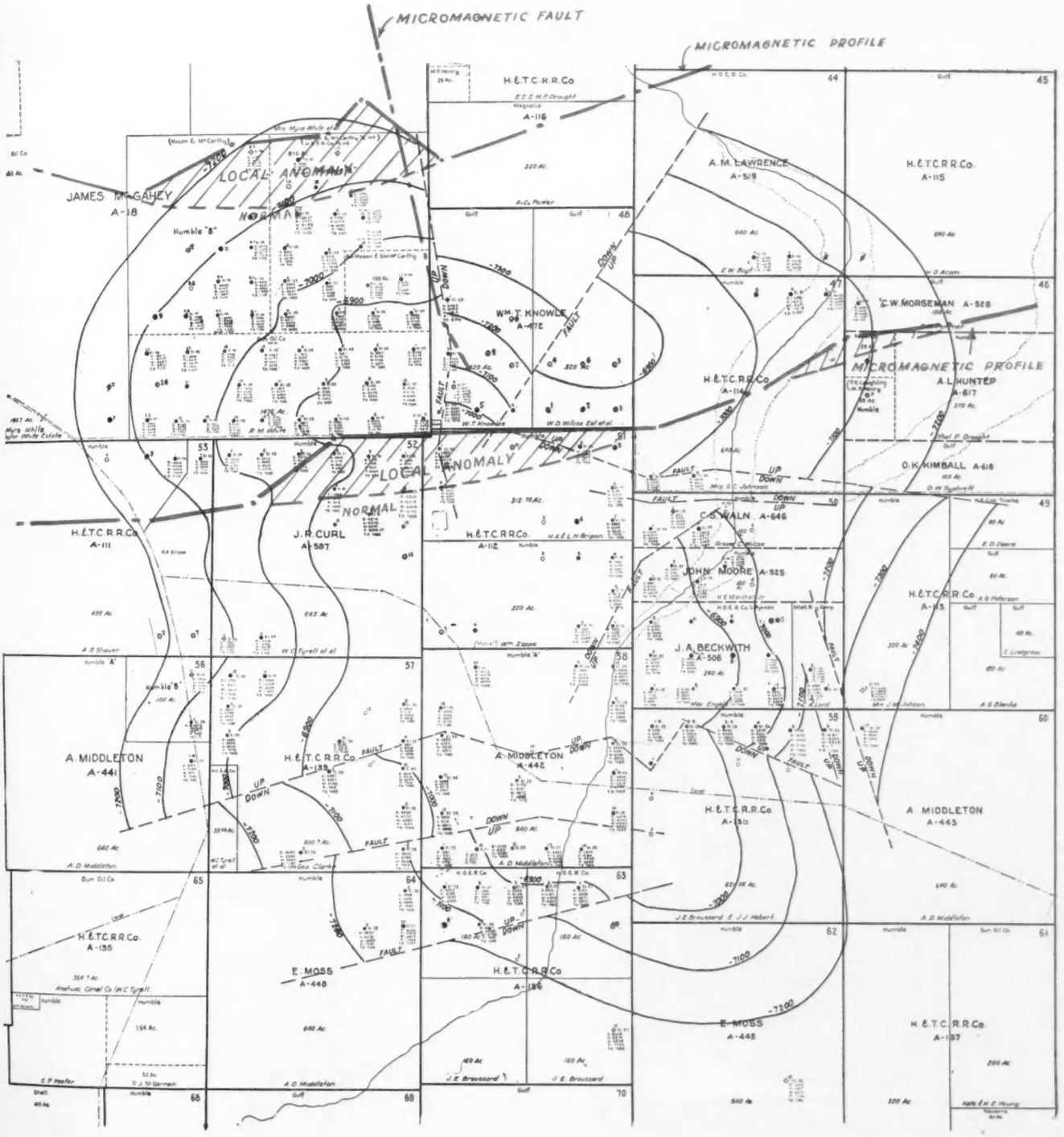
Two and a half months after the publication of the micromagnetic plat for Anahuac, the Oil Weekly announced on July 13, 1936, "an interesting wild-

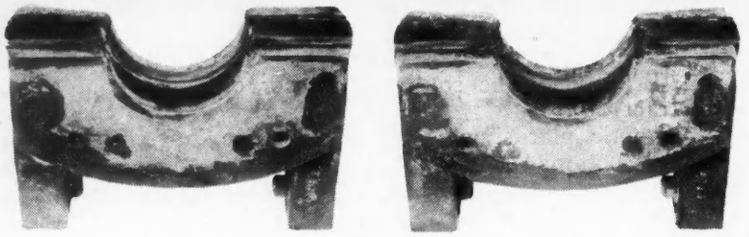
cat location, about 1¼ miles northeast of the Anahuac field, Boyt 1, in the southeast corner of section 44, abstract 519.

The micromagnetic plat showed a very definite local anomaly in section 47 in a profile along the Anahuac-Stowell road. This anomaly, which must be interpreted as a possible eastern extension of the field, was therefore published months before Boyt 1 came in a flowing well.

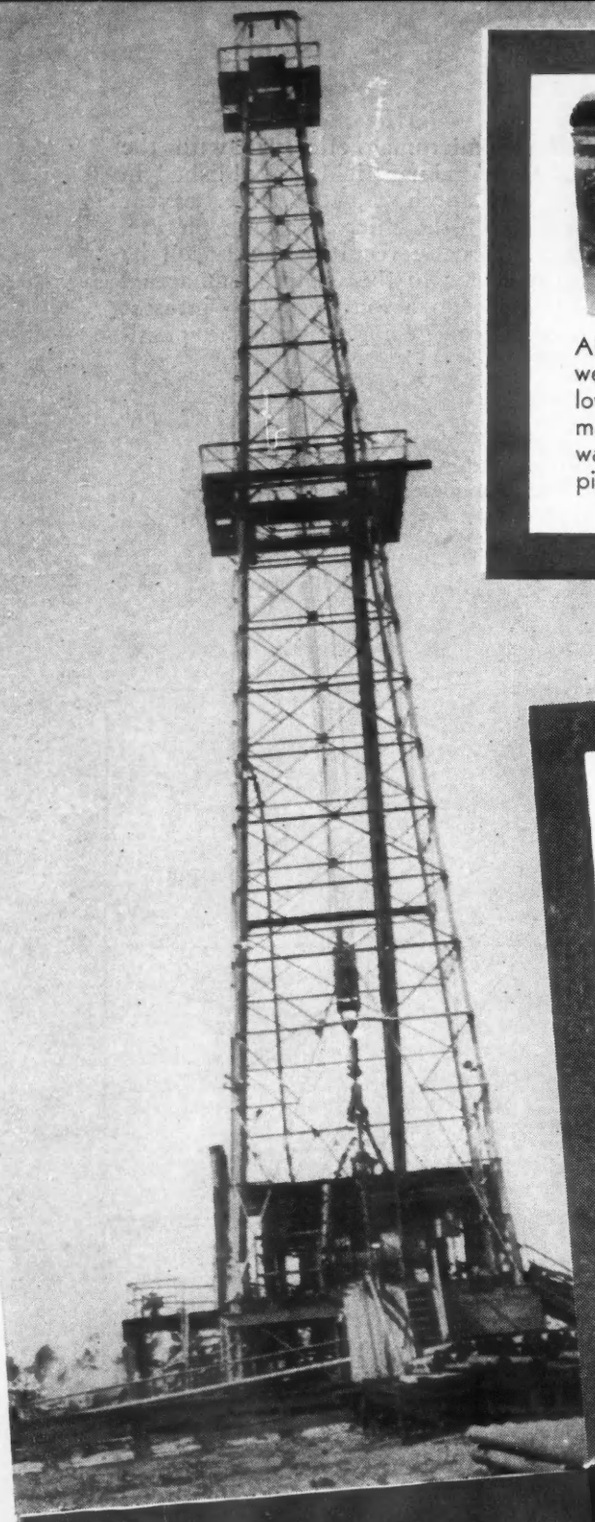
By comparing the micromagnetic plat with the Frio contours of the Anahuac field as published in The Oil Weekly on March 22, 1937, i. e. a year after the publication of the micromagnetic picture, the value of micromagnetic results should well be appreciated, and it seems to the writer, that actual facts like these should go a long ways to interest even the most skeptical geologist into the possibilities of this method.

The red lines represent micromagnetic profiles across the northern extension of the Anahuac field. This appeared in The Oil Weekly of April 27, 1936, when only four wells had been completed north of the lower profile. How well later developments showed this profile to be correct is shown by the map shown in black, which is of recent date.

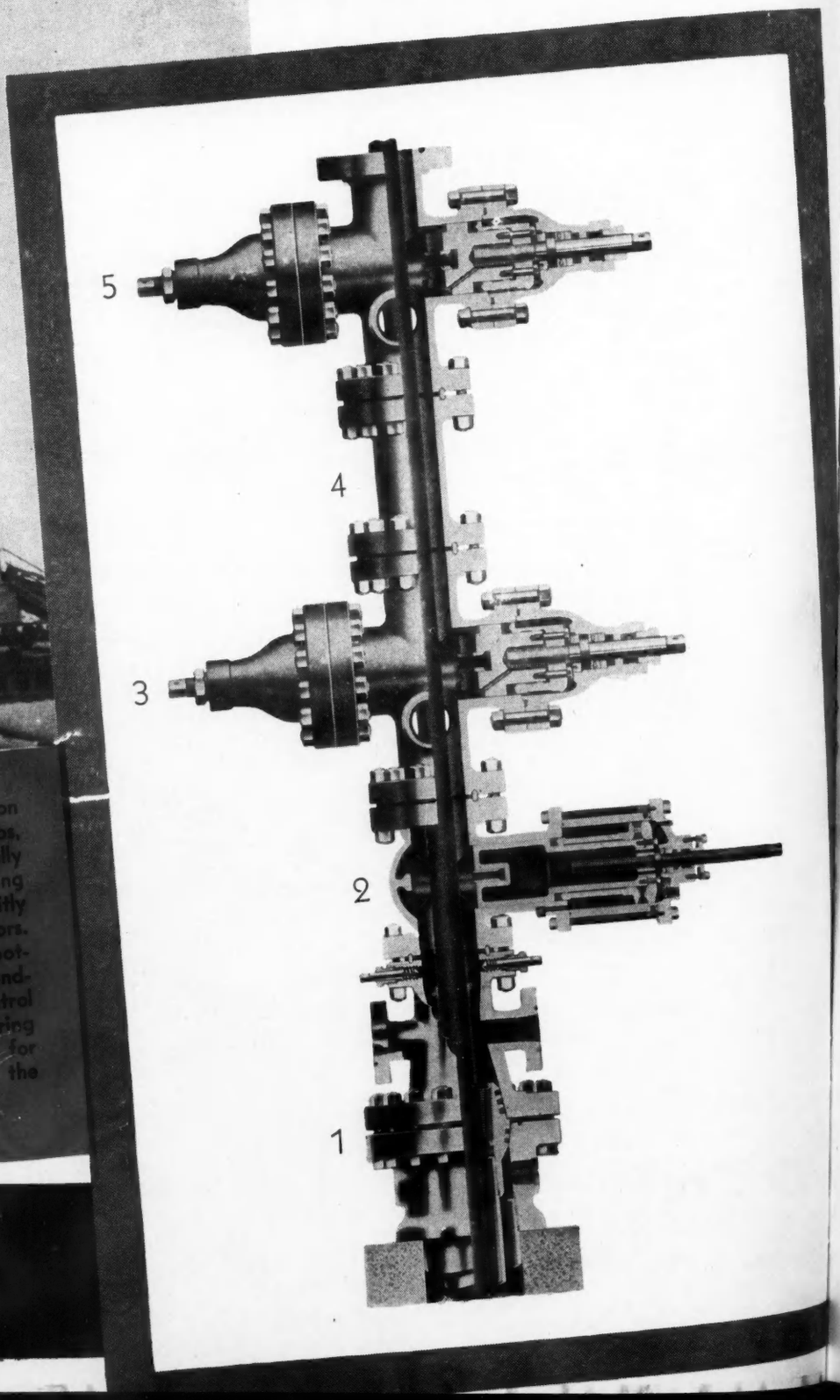




Above are the Cameron Self-Feeding Ram Packing Elements which were in the upper Type "RL" Preventer shown in the Hook-up below. Of the combined reserve of 7 cubic inches of resilient packing material built into these two packers, not more than 3 cubic inches was worn away by the running of this 11,700-foot string of drill pipe through the closed rams.



Because of their unfailing performance on increasingly difficult deep completion jobs, Cameron Types RL and RH Manually Operated Blowout Preventers are being adopted widely and relied upon implicitly by many major and independent operators. On deep wells having high potential bottom hole pressures the factor of dependability is paramount, and Cameron control units, because of their sound engineering and careful manufacture, have won for themselves a high ranking position in the past several years.



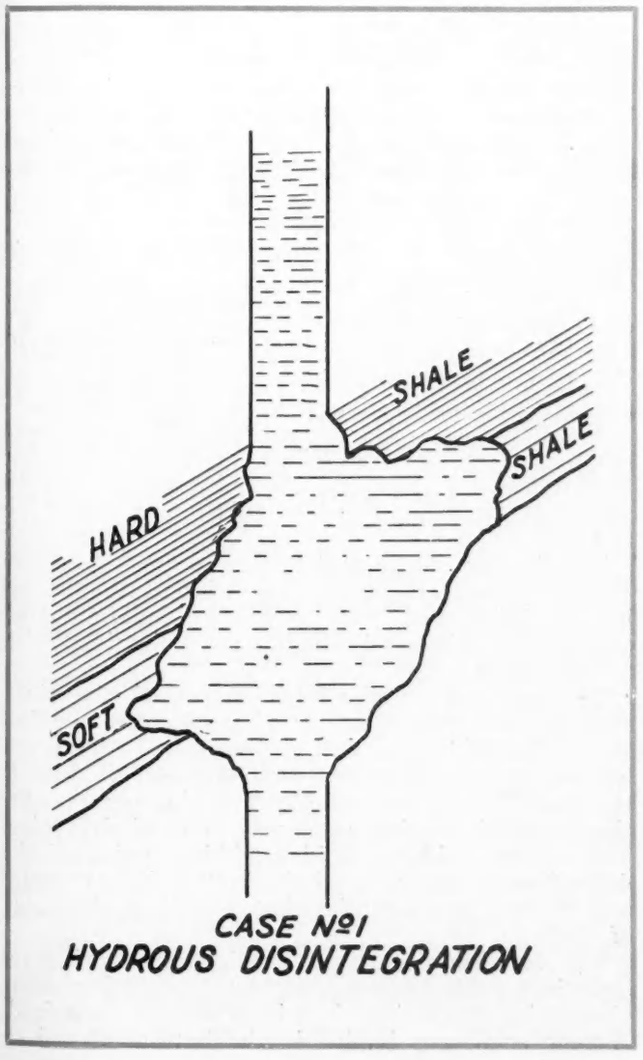
PROGRESS THE PAST YEAR IN

Heaving Shale Drilling

FEATURED BY IMPROVED MUD PRACTICES AND MECHANICS

By BRAD MILLS, Associate Editor

PROGRESS in drilling heaving shale during the past year was featured by the use of improved drilling fluids and more efficient mechanical methods. This troublesome formation normally is encountered in several Gulf Coast areas, and has been the principal barrier to deep development in several promising sections. Due to loss of interest on the part of several operators who previously had failed to make marked progress in the true heaving shale belts, a smaller percentage than usual of the total number of wells drilled along the Gulf Coast were located in these questionable areas. The temporary shift of operations to flush areas not bothered with heaving and caving formations also affected the status of field work in the Gulf Coast district.



The future solution of the heaving shale problem appears as important now as it appeared five years ago. It is true that several companies have lost interest in the solution, but the lack of interest should be attributed to the limited progress toward a solution, and not to the belief that the solution is unimportant.

The trouble all along has been that almost every operator thought the problem would be solved by one great stroke or discovery. Developments during the past two years have proved this theory to be entirely wrong. The solution will come gradually, inch by inch, and the operators will hardly recognize the answer when it appears. It is being, and will be, brought about by a form of evolution, just as deep drilling or rapid drilling has been advanced.

Operators who become and fall by the wayside will be at a distinct disadvantage when the problem is solved. The few companies who continue to drill a little deeper each time in heaving shale belts are the ones who eventually will solve the problem. The true solution will represent the sum of a thousand improvements, and not a single magic or master stroke. Experience, not a single invention, will be the principal medium by which the full thickness of heaving shale formations will be drilled.

The abondonment of each well in the heaving shale belt has enhanced the possibility of ultimate success. Such a statement does not appear anomalous when it is considered that each sincere effort to drill heaving shale results in advancement through the medium of experience. The equipment and methods that caused failure will not be used again, while those items and factors that showed to advantage will be used as the basis for future operations. The good and old methods, plus new methods will give a steady progress in heaving shale drilling.

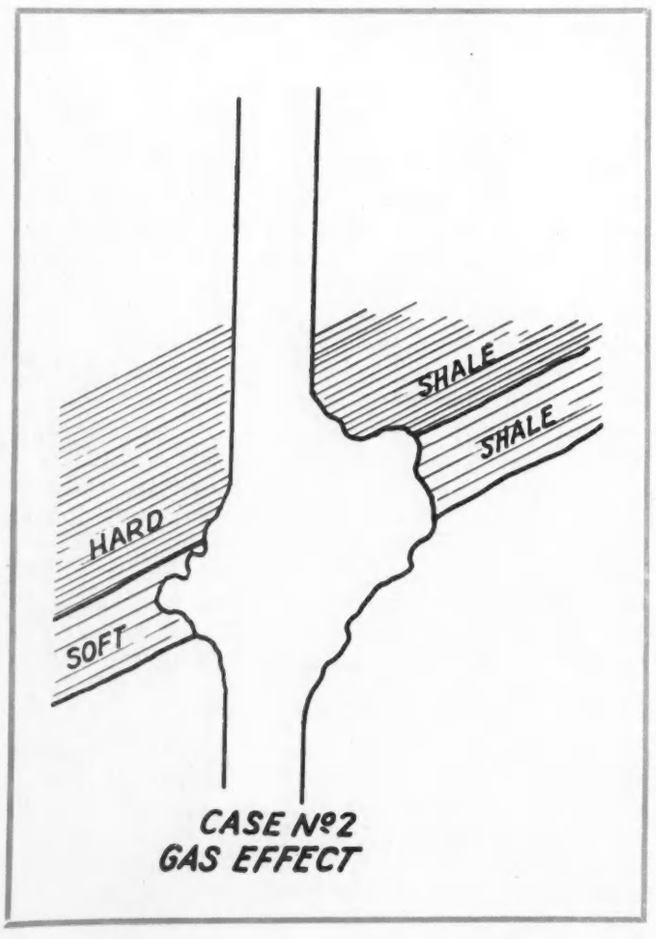
Present Methods Better

The ease with which limited sections of heaving shale are drilled proves that present methods are far superior to those of a few years ago. Where wells were lost at 6000 feet, it has been possible to drill to 8000 and 9000 feet before losing the hole. In the most troublesome areas it has not been possible to drill thick heaving shale sections without serious reverses,

and partial success in recent tests were encouraging. One well was drilled to 9000 feet in an area that showed abandoned wells at less than 7000 feet. Although progress during the past year was outstanding, it fell short of an actual solution to the problem. The first wells were lost soon after encountering the heaving shale below 6000 feet, but it was possible to add a full 2000 feet of heaving formation before abandonment of the last well drilled in the immediate area.

The method of attack has involved mechanics and chemistry in about equal proportions. The use of a satisfactory drilling mud is absolutely essential in any heaving shale program that considers the characteristics of the caving formations. Both the surface and underground equipment have been changed to give better circulation to the mud, and to prevent disturbance of the heaving formations. All operators appreciate the importance of a uniform mud head against the formation, and while drilling heaving shales the principal effort is centered on a circulating action that will not seriously disturb the disintegrating strata. A quick change in mud pressure near the bottom of the hole has caused trouble in the past, and sharp pressure differentials of any kind are avoided.

The attitude of operators toward heaving shale has changed some during the past two years, but there still is no agreement on its nature. A formation designated as heaving shale by one company is not recognized as heaving shale by another company. This difference in opinion has prevented an organized attack on the problem along the Gulf Coast, but a better spirit of cooperation exists now than was shown a few years ago.



CASE Nº2
GAS EFFECT

In the heaving shale belts, any shaley formation that disintegrates readily in water and tends to slough into the hole during normal drilling operations is classified as heaving shale. Some of the shales that blow into the hole under a high gas pressure also are true heaving shales. The shales that are readily affected by water and are charged with gas are the most difficult of all to drill.

The three types usually accepted along the Gulf Coast as heaving shale are (1) the shales with thin, alternating layers of gas sands, (2) shales with partings that carry matter of Bentonitic nature, and (3) broken shales that lie at an angle from the usual horizontal position. Shales of a certain type cave when lying at an angle, but give little trouble when lying flat. Most of the shales lying at an unusual angle have been broken and disturbed, and obviously are more sensitive to a disturbance than the unbroken shales.

The nearest approach to a true "heaving" shale is the one carrying gas. Opening a hole into this type of formation creates a pressure differential that leads to trouble unless drilling mud of the correct weight is used. Many shales simply cave and disintegrate when acted upon by water, but they may prove as difficult to handle as the more stable shales carrying gas. Any shale that sloughs, crumbles and falls into the hole in excessive quantities may be classified as heaving shale. Some of the heaving shale strata are thin and cause little trouble, but several alternating layers or one great thickness of a heaving formation may cause the loss of a well.

Four Distinct Types

Four distinct types or cases of heaving have been observed during drilling operations in Calhoun and Matagorda Counties, Texas. These cases, listed in the order of occurrence and not necessarily in the order of importance, were:

1. A hydrous disintegration of soft shales.
2. Gas pockets that caused the shale to heave into the hole in quantities.
3. A swabbing action that disturbed the shale that previously had given no trouble.
4. Expansion of gas in the drilling mud, a condition that reduced the weight of the drilling fluid to a dangerous point and permitted shales to heave.

The first case was the most common, and it was not until a satisfactory drilling mud was used that the trouble was overcome. Water in contact with the soft shales long has been recognized as a disturbing factor.

The drilling of gas pockets in the unstable shales caused considerable trouble and forced the use of heavy drilling mud. It was possible to build and hold a wall when the mud weight was maintained with a high safety factor.

The swabbing action that disturbed the shale strata was largely a matter of carelessness. Pulling the drill pipe in one well seldom failed to cause a heaving action that gave serious trouble. Most of this trouble was overcome by pumping out the cuttings and circulating out each joint of drill pipe. Tests proved that a rapid swabbing action of the drill pipe sharply reduced the bottom hole pressure and created a differential that permitted the entry of shale.

The expansion of gas in drilling mud with a release in pressure represents a much more important phase of mud cutting than is generally recognized. A very small gas bubble in the bottom of a deep

hole is capable of becoming more than a hundred times as large in the mud near the top of the hole. This great expansion of gas results in a displacement that reduces the weight of the mud column. In a well in Calhoun County, Texas, drilling mud was pumped into the hole at 15 pounds per gallon, but the average weight of the returned mud was less than nine pounds per gallon. The small gas bubbles picked up near the bottom of the hole had expanded to a point that barely permitted holding the well under control. Careless mechanical treatment of mud can result in the loss of a well under such conditions. Use of mud that picks up a minimum quantity of gas is a requirement in the high pressure heaving shale belts, and reconditioning of returned mud is as important.

Various synthetic and chemically treated muds have been used in drilling heaving shale. Conditioners and weight materials also are an important part of well-balanced drilling fluids that give best results. Ordinary brine mud recently was used to advantage in a heaving shale well in Matagorda County, Texas.

Chemical Studies Continue

A long study has been made by a few companies to determine the reaction of heaving shale to various muds and mild chemicals. Sodium chloride (salt brine) in solutions ranging from five to 25 percent was used, and this fluid in strong solutions slightly checked the disintegration of heaving shales that were dissolved by fresh water. Solutions of 5, 10 and 15 percent did not prevent the soft shales from dissolving, but the 20 and 25 percent solutions had a less damaging effect on the shale. The 25 percent solution failed to hold the shale, but it broke and remained in larger pieces than in the weaker solutions. The shales used during experiments were the soft type that dissolved in fresh water.

Calcium chloride solutions also were used in experiments to find a base for satisfactory drilling fluids. The 20 and 30 percent solutions did not prevent the shale from breaking up and disintegrating, but the 40 and 50 percent solutions were more effective. They did not, however, prevent the shale from breaking into small pieces and giving trouble.

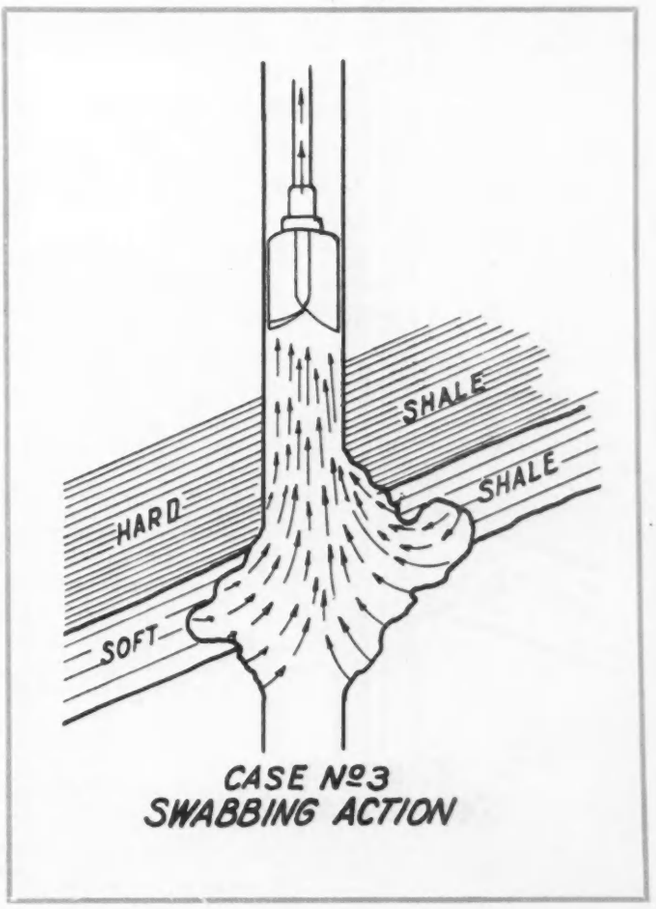
The use of silicate of soda is not entirely new, but marked progress in its adaptation to heaving shale drilling has been made. Drilling mud made partly or largely from this compound has proved very effective in drilling heaving formations along the Gulf Coast. The Texas Company and Continental Oil Company have pioneered the use of silicate of soda as a drilling mud, and other companies have more recently employed the compound in heaving shale belts. The Texas Company was the first operator to use this type of drilling mud on a large scale, having experimented with it while drilling heaving shale in 1935 at Bryan Heights, Texas. During the drilling of the first well on this structure, the drilling mud was composed of a mixture of one-third silicate of soda and two-thirds ordinary mud. The latter two-thirds contained the required percentage of conditioners and weight materials, while the one-third of silicate of soda was held fairly constant.

While notable progress was made in this first attempt, it was evident that a higher percentage of silicate of soda was required to hold the shale under difficult conditions. Continental Oil Company used this compound with considerable success in drilling wells near Seadrift, Texas, but found that the most effective mud of this type contained more than 50 percent silicate of soda.

Higher Percentage Required

Since ordinary salt brine has several advantages over fresh water, its use with silicate of soda has been adopted by a number of operators in the mixing of a drilling mud for handling heaving shale. In arriving at the correct proportions of each, experiments have been conducted to determine the reaction of heaving shale in various mixtures. A compound of 10 percent silicate of soda and 90 percent salt brine slightly checked the disintegration of the true shales, but the mixture fell far short of meeting requirements. The shale broke into small pieces, but it did not completely disintegrate as it had done in water. A compound of 25 percent silicate of soda and 75 percent salt brine was tried with better results. The shale still broke into pieces, but in larger sections than in the weaker compound. A mixture of 50 percent salt brine and 50 percent sodium silicate was tried, and in this compound disintegration of shale practically stopped. The "50-50" mixture apparently sealed off the shale and prevented hydrous disintegration. As an extra precaution, a compound of one part salt brine and two parts silicate of soda is used as a drilling mud by several operators in the heaving shale belt.

The caving and heaving formations apparently are not affected by contact with this type of mud, but it can not be said that its use guarantees the full penetration of all heaving shale strata. Other fac-

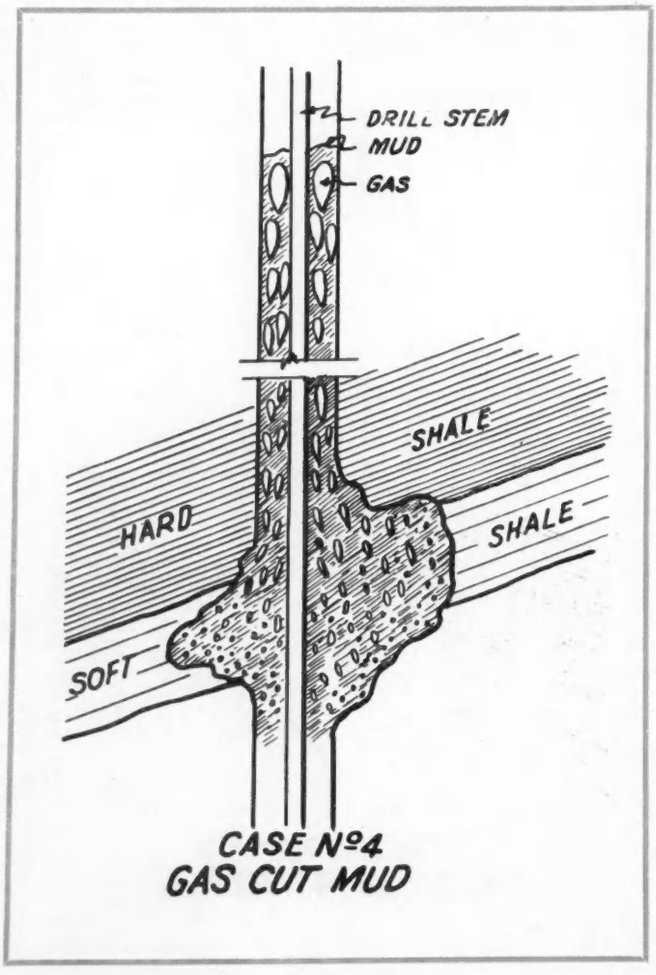


tors must be considered, and it might easily be possible to lose a well from mechanical reasons when the drilling mud was ideal.

Continental Makes Progress

Continental Oil Company's success in drilling heaving shale at Citrus Grove, Matagorda County, Texas was perhaps the outstanding achievement of the year in this line of endeavor. The company's Robbins 2 was drilled to 11,612 feet, after encountering the first heaving shale at about 6300 feet. The well was abandoned May 11, 1937, but the hole was in good condition to bottom and it was not necessary to stop drilling because of trouble from heaving formations. The troublesome shale streaks were found at various levels between 6300 feet and bottom, and at no time was it possible to conclude that the heaving formations had been fully penetrated. The frequent and irregular occurrence of heaving and caving strata below 6300 feet forced the company to maintain its vigilance to the day of abandonment. Bad shale streaks were encountered near bottom, and increased depth added to mechanical problems. This well, the deepest ever drilled along the Texas Gulf Coast, encountered caving or heaving shales through a greater thickness than was ever recorded in another well.

The mechanical layout designed and used for drilling Robbins 2 was one of the most elaborate ever assembled in any district. The surface equipment represented a heavy investment, and a safety margin was provided for every detail. Three heavy slush pumps, five boilers, double draw works and engines, special steel mud tanks, a derrick elevated four feet higher than standard, a double gooseneck swivel, two steel rotary hose, heavy casing lines and traveling equipment, a mud degassing unit, and many other special items completed the surface equipment at this well. The company capitalized on previous experience in drilling heaving shale in other areas, and was able to assemble equipment that already had worked to advantage. All of the equipment was arranged to give uninterrupted service during sustained drilling operations in the heaving formations.



Special Mud Equipment

Special attention was given to equipment for handling drilling mud. One 500-barrel and three 1000-barrel steel tanks were used for principal mud storage, but a large earthen mud pit was used as a reserve. Four 6 x 8 x 20 rectangular steel tanks were used for the immediate mud supply. These tanks were high enough to give a good head to the slush pumps, and eliminated the usual loss in efficiency through suction. Each of three tanks were connected direct to a slush pump, with the fourth rectangular tank used as a mixing medium. The tanks were connected near bottom by a flow line and valves, but normally each tank was used separately.

The two 20-inch slush pumps and a single 18-inch pump provided a heavy flow of mud under difficult requirements. The two mud screens, the mud ditch, the rectangular tanks and the slush pumps were housed under sheds.

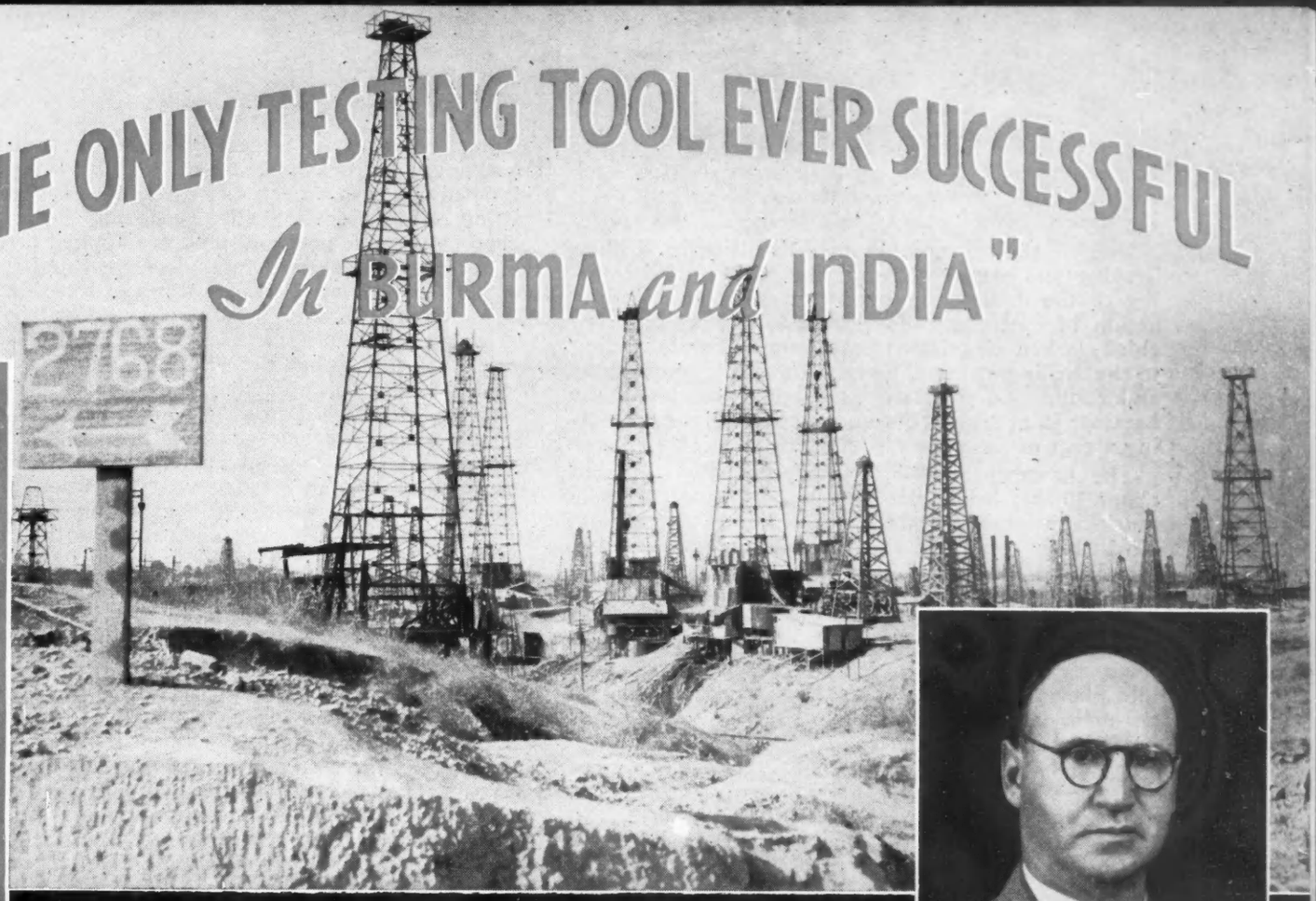
The degassing unit, which resembled an ordinary oil and gas separator, never was used. It was the intention to pass the mud through this separator, take the gas off at the top, and return the mud to storage from the bottom outlet. Trouble with gas in heaving shale at Seadrift prompted the installation of the degassing unit. Fortunately gas gave little trouble while drilling Robbins 2.

A second gooseneck was built into the swivel used during the difficult drilling period, and two hose were attached. The necessity for maintaining a heavy and constant mud flow gave the superintendent the idea for the first swivel of its type ever used. The arrangement gave a greater circulation of mud than had been provided with a single swivel and hose. The use of casing for drill pipe during reaming operations obviously gave a much greater displacement through such casing than was provided by a single drilling hose on the surface.

A 25½-inch hole was started, and a string of 20-inch casing cemented at 200 feet. A string of 16-inch 84-pound was cemented at 3000 feet. The 11¾-inch, 60-pound casing was landed at 6430 feet as the first step of the attack on heaving shale. A 10⅝-inch hole was drilled in the conventional manner from 6430 feet to 8908 feet, but later a decision was reached to ream the hole from the 10⅝-inch diameter to a full 13 inches. To accomplish this ambitious reaming effort a string of special 8⅝-inch, 43-pound casing was used as drill pipe, and a collapsible bit placed on bottom as a reamer.

Reaming started immediately below the shoe of the 11¾-inch casing at 6430 feet, and the old 10⅝-inch hole was fully reamed to 13 inches. Drilling continued with the reaming string to 8912 feet, where the 8⅝-inch casing string used as drill pipe was cemented as a full-fledged shutoff. The bottom of the 8⅝-inch string was milled out, and open hole carried to 11,612 feet. The drill pipe program included 6⅝-inch to 6612 feet; four-inch ahead of the ream-

"THE ONLY TESTING TOOL EVER SUCCESSFUL *In* BURMA *and* INDIA"



Says B. R. EMRICK,
former technical advisor over drilling and producing for a large Asiatic Oil Company:

The Johnston Tool is one formation testing tool which leading operators know will work anywhere, under any conditions, be it in the U. S. A. or any other oil producing country.

The Johnston Tool recently won a favorable decision on its patent rights in the highest United States court*, just as it has won a favorable decision from operators in the field since it was introduced years ago as the ORIGINAL FORMATION TESTING TOOL.

PATENTED FEATURES

These patented features of the Johnston Formation Testing Tool provide positive workability and definite results:

1. **TRIP VALVE—assures getting on the seat without danger of leakage, and distinguishes between drill stem test and drill stem leak.**
2. **PUMPING DEVICE—permits circulation at any time, after packer is set, or while tool is running in or out of the hole.**
3. **EQUALIZING VALVE—equalizes pressure above and below packer when ready to unseat the tool.**

A Pressure Bomb, which is also a feature of the Johnston Formation Testing Tool, provides a record of the pressure at any point in the hole, and also provides an exact reading on the bottom hole pressure when packer is seated.

It is because of these features that more and more operators are turning to the Johnston Tester, even though the cost is slightly higher.

*** U. S. Supreme Court refused writ of certiorari to review decree of U. S. Circuit Court of Appeals, New Orleans, La., May 3, 1937. Case No. 835, Halliburton vs. Johnston.**

Johnston
OIL FIELD SERVICE CORPORATION
131 HARVARD STREET HOUSTON, TEXAS

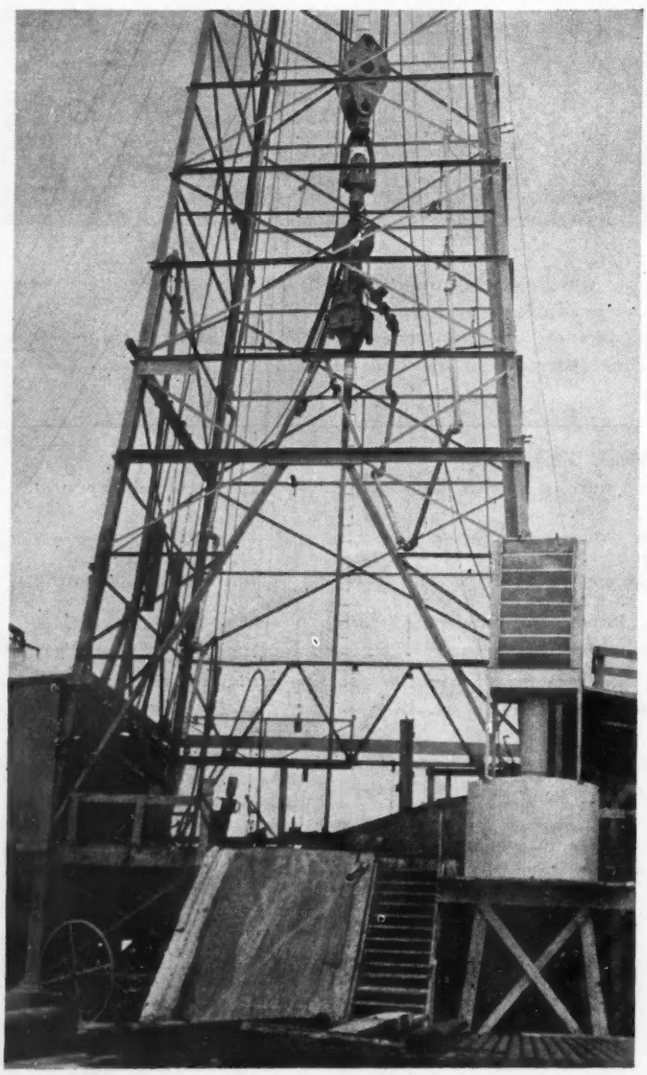
WHY SET CASING BEFORE YOU KNOW
BAIL CASING TO TEST PERFORATION ?

ing job to 8908 feet; and 3½-inch, external upset, to bottom from 8912 feet. Drilling with the four-inch drill from 6430 feet started February 20, and the drilling time to 8908 feet was only 10 days.

One of the most common difficulties in drilling heaving and caving shales is the sticking and freezing of the drill string by the packing and settling action of cuttings and cavings. This has occurred chiefly when circulation was stopped while adding to the drilling string. The need for quick connections and continuous circulation prompted the use of the hammer joint and a continuous circulation joint during a part of the most difficult drilling.

The hammer stabbing joint ordinarily is placed about 10 feet below the swivel and is used to make quick connections between it and the drilling string. No kelly is used. This device consists of two parts, a male and female end. The female end is connected direct to the swivel by an 8- to 10-foot sub. It is lowered over the male end, which is made up on the casing stand in the rat hole. Upon being lowered over the male end, two wedge-like keys are hammered into place through the female end, engaging lugs on the male end to make a tight connection. Safety pins hold the wedges in place.

The continuous circulation joint is made in the form of a tool joint and is about 30 inches long. A 3-inch threaded opening is provided in the side, but this remains closed with a lock plug during normal drilling operations. In a closed position the side plug engages and holds a hinged flap to give the joint its full opening. When necessary to add casing to the drilling string used as drill pipe, a mud hose is attached to the side port and pressure applied through the opening while pressure is decreased and finally stopped from above. Pressure through the side port causes the hinged flap, which was released by unscrewing the side plug, to seat upward and close the vertical passage. When the additional stand of casing is added to the drilling string, the normal flow again is directed downward and the hose is removed from the side port. The side opening then is closed by screwing the lock plug into place, where it engages and hold the flap in its downward position. These joints are placed at the top of every double of casing used as drill pipe. They are as strong as the casing and do not add to the diameter of the drilling string. The joint has been used on 8⅝-inch casing and regular drill pipe. It was developed by J. G. Dyer, manager of the production department of the company.



Surface equipment at Continental Oil Company's latest Citrus Grove test was elaborate, and included two items of practically all drilling units so as to prevent a shut down. Among the equipment was heavy swivel with two goosenecks, which is shown here.

Special Mud Attention

In drilling the great thickness of heaving shale in Robbins 2, Continental Oil Company gave special attention to the drilling mud. A salt brine mud, chemically treated and conditioned, was used during the drilling of troublesome formations. The chief difficulty was keeping the weight up and the viscosity down, but an almost constant check on the mud kept it in condition. Three men, each working eight hours per day, gave all of their time to testing the mud. Native clay was used as the base for the mud but conditioners and weight materials were added as needed. The mud weight was held at 16 pounds per gallon, and the daily mud expense ran very high. The brine solution apparently gave much better results than fresh water would have given. Pieces of shale weighing from two to three pounds were caught in the mud regularly returned from the hole.

Although Robbins 2 was abandoned at 11,612 feet, the hole was in good condition to bottom, and the decision to quit was prompted by lack of promising deeper formations and not because of fear of heaving shale. Drilling stopped in the Frio, the original objective, but a thick section of this formation was cut before abandonment of the well was ordered. The Vicksburg below the Frio was not regarded as a promising formation in this area.

Progress in drilling heaving shale has been made in other Gulf Coast districts during the past year. Caving and heaving formations have been handled successfully in the Jennings, Louisiana, and Hull, Texas, fields by the use of silicate muds. The principal attack has been through the medium of drilling mud, but mechanics also has played an important part. Many improvements have been made in facilities for handling the mud and for maintaining a fairly constant pressure on the troublesome formations. Better drilling equipment and a greater safety margin in all phases of operations have been factors in progress in drilling heaving shale strata. Early attempts to drill heaving formations with equipment that barely met requirements for more favorable drilling always resulted in failure.

Drilling Mud

WORK NOW MORE SYSTEMATIC AND MORE HIGHLY DEVELOPED

By BRAD MILLS, Associate Editor

MAJOR oil companies during the past year have given increased attention to rotary drilling mud. This recent attack on the problem has been more systematic and less sensational than earlier attempts that were not directed at any definite objective. The employment of highly trained men has been the chief factor in development of mud programs that are giving uniform results under severe conditions.

The trend away from complicated mud conditioning programs of five years ago has been pronounced. Efforts have been simplified, as more has been learned of mud behavior and requirements. The promiscuous dumping of chemicals with the hope for certain reactions has all but ceased in areas that offered the most serious operating problems. All the experiments and laboratory work, however, had their place, and through elimination the most effective processes have been saved.

Rotary drilling mud in its simplest functions walls the hole, lubricates the drilling bit and carries the cuttings to the surface. Variations from the ideal drilling conditions are frequent and severe, and the use of mud without constant attention may easily lead to serious trouble. The importance of mud conditioning was not fully appreciated until less than 10 years ago, and principal progress along this line has been made since 1930.

Deep drilling high pressures, caving formations, and care of surface equipment have been factors forcing the recognition of mud quality. Little attention was given drilling fluids during the 1910-1930 development period. A hysteria of interest developed almost suddenly, and between 1930 and 1934 "mud" was a favorite topic of discussion at production meetings all over the country. At the end of that short period it developed that little, after all, was known about drilling mud. A saner attitude has been assumed during the past three years, and as the result progress in mud compounding and conditioning has been made.

Needs Constant Conditioning

Any good mud that meets all major requirements is a safe drilling fluid to use in oil well drilling. A mud does not need to be a complicated mixture to give satisfactory results under normal conditions. A simple and desirable mud often fails because constant conditioning is overlooked. The average operator is awakened to the value of conditioning only when he is using an expensive drilling fluid, or during difficult operating periods. An ordinary drilling mud that needs conditioning may "get by" during shallow or easy drilling periods, but if it were possible to measure the increased wear on equipment, there would be an obvious need for conditioning even under such easy operating conditions.

The conditioning of drilling mud involves both a chemical and mechanical process. Under extreme conditions either the mechanical or chemical phase may become the more important. Where treacherous formations are encountered and pressure is not a problem, chemical treatment usually gets the preferance over the purely mechanical reconditioning phase of operations. In many areas the troublesome formations do not carry an objectionable percentage of sand, and many shales actually make good drilling mud. Several shale belts along the Gulf Coast yield so many soft strata that constant thinning and treating are necessary to control the viscosity of the drilling fluid.

The growing tendency to place an engineer or chemist in charge of company mud research has elevated this phase of field work and taken much of the guesswork out of the old method of attack. All of the larger producing companies have designated engineers who give all of their time to the improvement of drilling fluids. Some of the major companies have trained as many as six men along mud lines and are able to carry on several difficult drilling operations at one time. It has become the custom to place an engineer in charge of mud at each well, where serious formation problems are encountered. Two large Gulf Coast operators recently placed a chemist and engineer at each of two difficult drilling wells. In an extreme case where heaving shale was the problem, a third man was stationed as a helper and others were subject to call.

The employment of real scientists as mud men has provided a systematic attack on drilling problems that could not be solved by laymen or practical workmen. Early attempts to thin mud by adding water were not always satisfactory, while efforts to "settle out" sand in a pit were equally as weak. The need for a more systematic study of mud conditioning has been obvious since the advent of deep drilling, and employment of trained engineers and chemists has been a contributing factor in progress of the past few years.

Drilling contractors have added petroleum engineers to their field staffs and several of the larger contractors have a trained man who gives his full time to mud problems. This arrangement particularly applies to operations along the Gulf Coast and

in areas where pressure is a problem. The drilling contractors usually work direct with the oil companies on difficult drilling jobs, and as many as four men have given their full time to mud conditioning under extreme conditions.

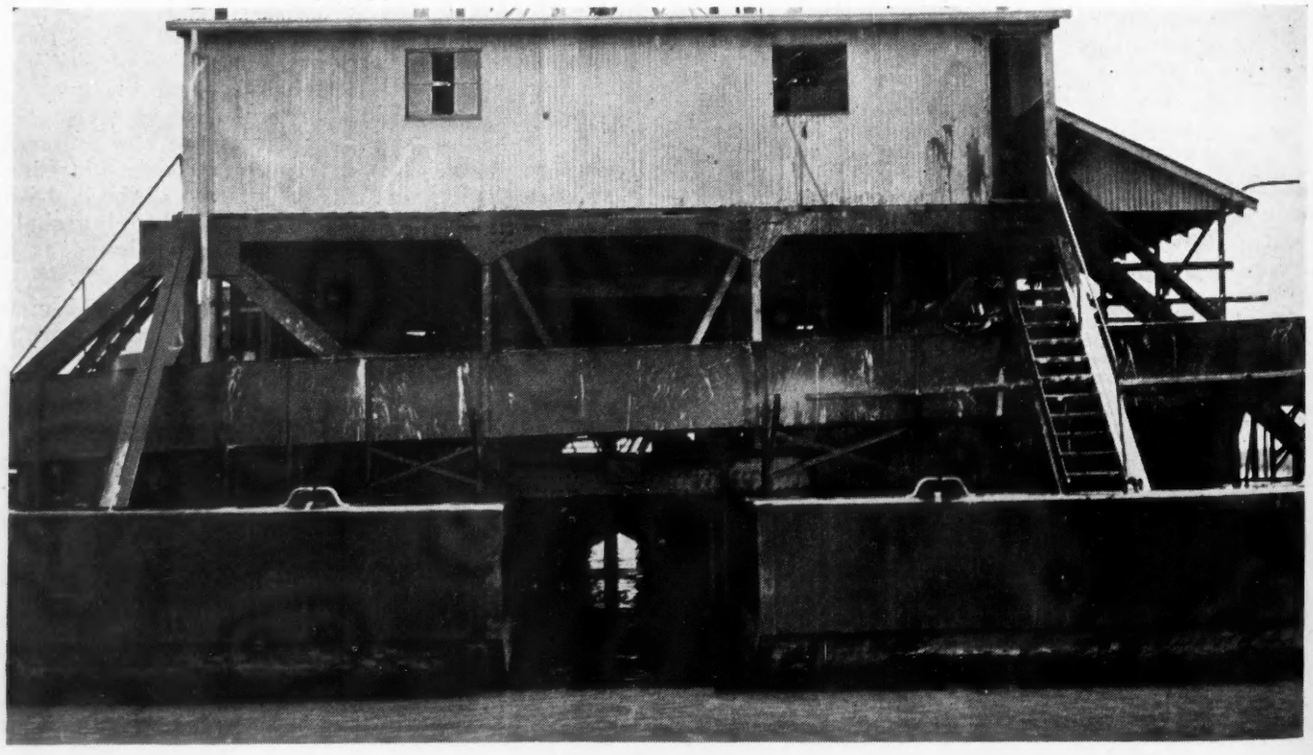
The wall-building qualities of drilling fluids continue to interest operators who drill in all types of formations. The ability of a mud to build an impervious wall under adverse conditions makes that mud stand out as the type best suited for the purpose. Experience along the Gulf Coast has proved that the adaptability of a drilling fluid largely depends on its wall-building qualities under extreme conditions. The building and holding of a full mud wall represents a greater effort than is generally recognized by the average operator. The absence of a satisfactory wall may not seem to check drilling progress in the favorable formations, but when the very troublesome strata are encountered the necessity for a good wall is apparent.

The colloidal content of a drilling fluid affects its wall-building qualities, and it would not be far from correct to state that wall-building increases as the colloidal content increases. Recent experience in drilling troublesome formations proved that mud with a low percentage of colloidal matter and a high percentage of large non-colloidal particles builds a very unsatisfactory wall. Such a mud actually built a wall from ¾ to 1½ inches in thickness before it provided an impervious barrier. The filtering action of water into the formation continued until the wall thickness was two or three times that required with a mud rich in colloidal material. This type of wall offers several disadvantages over the thinner wall made from a superior mud.

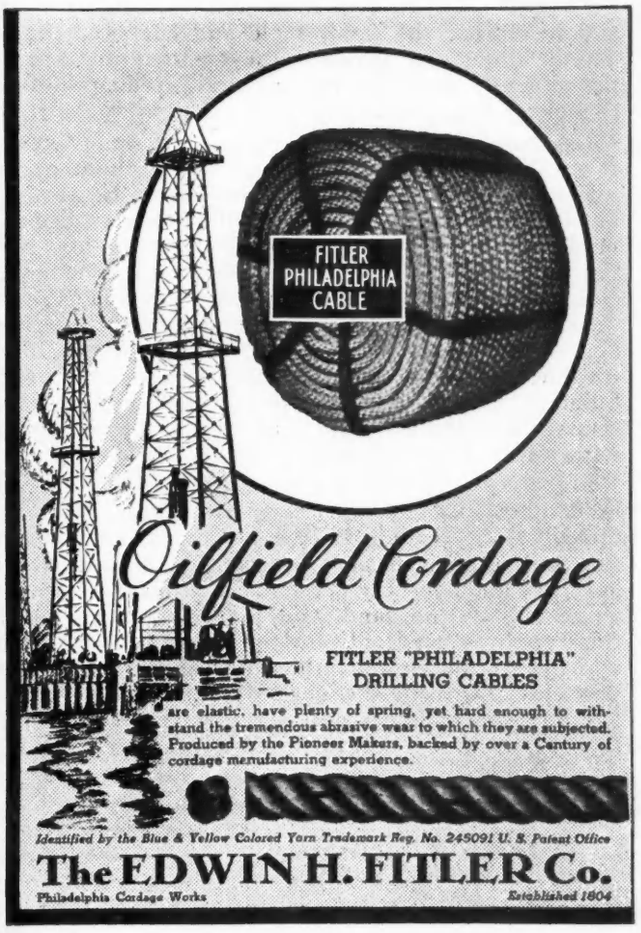
The rapid drilling of soft formations has encouraged the use of high colloidal muds. The time element is an important factor in wall building, and use of a mud that does not properly wall the hole during fast drilling is not a good practice. Mud with a low colloidal content leaves the newly made hole virtually "raw," and loss of mud and water to the formation is not unusual. A drilling fluid that requires a long time for building an impervious wall is not suited to the rapid drilling operations of today. The time element in wall building is recognized as an important factor in drilling unstable formations. Recent experiments indicated that an hour or more was required to build an impervious mud wall under adverse conditions. Rapid drilling in such formations would expose the bottom portion of the hole before a good mud wall could be laid down. Under the most favorable drilling condition a small amount of "raw" hole is exposed, but the natural mud head usually prevents trouble in the turbulent area on bottom.

The special emphasis on colloidal content has in most districts overshadowed attempts to treat questionable muds that carry only a limited percentage of colloidal material. The use of the proper mud in the beginning always minimizes special treating processes that cannot make a desirable mud from a poor mud. In all types of drilling fluid, operators have learned to demand high colloidal content.

The use of questionable mud in drilling the first few hundred feet has proved a very expensive practice in several fields. No thought was given to conditioning in a new Gulf Coast field while drilling to 200 feet, and the direct result was a channeling and caving action that undermined the entire cellar and almost caused the loss of the location. The drilling appeared easy from the surface to 1000 feet, but it developed that only by keeping the mud in good condition could channeling and caving of the soft formations be prevented. A good colloidal type mud



The steel trough or ditch in the foreground returns mud to the tank compartments on steel drilling barges used along the Gulf Coast. The conditioning of mud is an important phase of drilling operations in the inaccessible swampy areas.



Oilfield Cordage

FITLER "PHILADELPHIA" DRILLING CABLES

are elastic, have plenty of spring, yet hard enough to withstand the tremendous abrasive wear to which they are subjected. Produced by the Pioneer Makers, backed by over a Century of cordage manufacturing experience.

Identified by the Blue & Yellow Colored Yarn Trademark Reg. No. 245091 U. S. Patent Office

The EDWIN H. FITLER Co.

Philadelphia Cordage Works — *Established 1804*

from NEW YORK

a Suggestion to BUSINESS MEN

AFTER a busy day, many business men have reports to make—letters to write, etc. Those who live at Hotel McAlpin find ample writing desks, pens that WRITE, plenty of stationery . . . plus the comfort and quiet to concentrate.

Add to this the luxury of the NEW rooms, beautifully decorated and furnished, and you will understand why the McAlpin is the preferred New York Hotel of thousands of busy business men. JOHN J. WOELFLE, *Manager*

ROOMS WITH BATH FROM

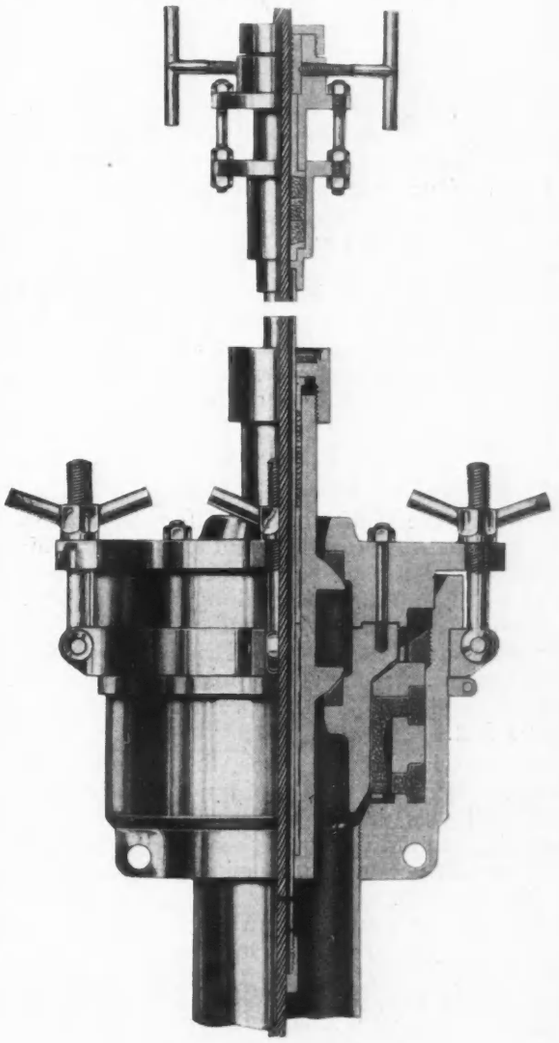
$2.50 Single $4.00 Double $4.50 Twin-Bedded

Hotel McAlpin

The Centre of Convenience

BROADWAY AT 34th STREET, NEW YORK

SAVING FORTUNES IN GAS and OIL!



KEROTEST

HIGH PRESSURE OIL SAVER

Before the advent of the Kerotest High Pressure Oil Saver, fortunes in oil and gas were wasted during cable tool operations. By effectively imprisoning gas and oil forced up under high pressure and thus permitting the continuance of drilling to the desired depth, the Kerotest Oil Saver has proved a veritable boon to modern drilling operations.

It has been tried, tested and proved to be dependable under all pressure conditions with cable tool drilling and affords ample safety to the drilling crew.

In addition, the Kerotest Oil Saver saves wire line from wear . . . maintains alignment . . . effects shut-off and retains balanced pressure on well while drilling—all in all an indispensable tool for modern drilling. Descriptive folder on request.

KEROTEST MANUFACTURING CO.
PITTSBURGH, PENNSYLVANIA

later was used and kept in condition, and no further trouble near the surface developed. The protective and plastering action of the superior mud was very effective and proved that good mud should be used from top to bottom. Mud conditioning while drilling near the surface often is an important phase of operations, due to the excessive sand content of shallow formations and the tendency toward channeling.

Weight is a factor in drilling fluid that has puzzled many operators, and companies do not yet agree on the margin of weight that should be carried. The trend has been toward a lighter drilling fluid than was used four years ago, but in extreme cases record mud weights have been established during the past year. Most of the larger producing companies agree that the lightest mud that does the work and gives a fair safety margin is the one to use. A greater amount of energy is required to handle and circulate heavy mud than light mud, and there are other reasons for using a comparatively light mud in preference to a much heavier product.

High Pressures Handled

The excessive pressures developed below 10,000 feet along the Gulf Coast call for very heavy mud, and no substitute can be found for weight under such conditions. Mud used in drilling to a record depth of more than 12,000 feet along the Louisiana Gulf Coast was held at 16½ pounds per gallon, and even such a weight barely gave the desired margin of safety. A deep well near Houston used mud weighing 17 pounds to control pressure developed above 10,000 feet.

In the Old Ocean, Texas, field, quality and condition, rather than weight of mud, have been stressed. One well was drilled to 10,400 feet with a highly conditioned mud that never was carried at more than 11.5 pounds per gallon, despite a high-pressure producing zone. The operating company determined the weight of the mud column necessary to offset the formation pressure, and used the lightest mud that gave a fair safety margin. The handling of the mud was turned over to engineers who gave their full time to conditioning the drilling fluid. Tests were made every 15 minutes during the critical drilling periods.

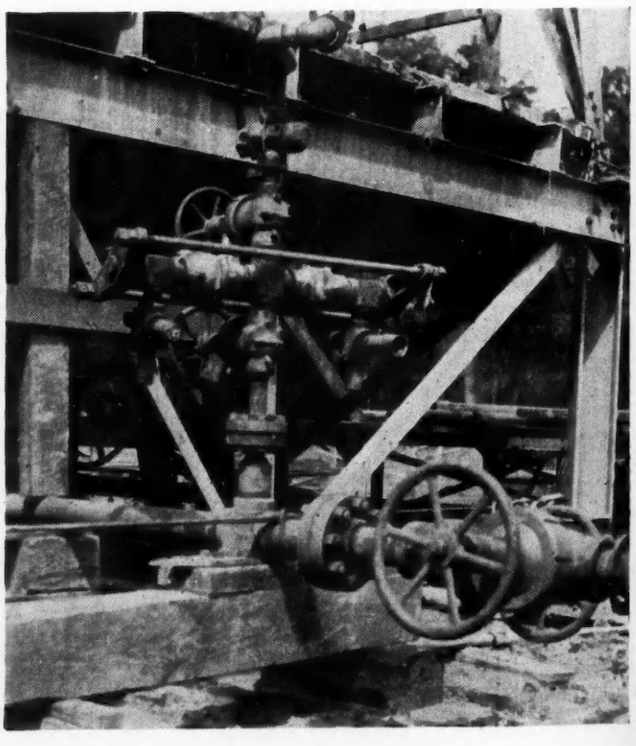
Successful completion of this deep well proved that mud several pounds heavier than that which barely keeps a well under control is not necessary. This drilling operation also proved that conditioning of mud while drilling high pressure gas formations is more important than promiscuous dumping of weight material to offset the bad effects of a gas-cut drilling fluid. The mud men on this job were able to control the weight and viscosity of the mud to an extent that permitted use of a much lighter mud than ordinarily had been used with similar pressures.

The mechanical phase of the conditioning process at Old Ocean was particularly effective. The mud was screened and "reclaimed" by a revolving type machine that returned most of the colloids to the pit, and held back the sand, shale and coarse cuttings. The machine also helped in the removal of gas from the returned mud. The mud was not used again until it met all requirements.

Operators do not agree on the maximum amount of sand that may be carried in mud without harmful results. Theoretically no sand should be present, but it is impossible to remove all sand from drilling mud, even under ideal conditions. A very low percentage of sand usually is so cushioned by the softer colloidal matter that it does not seriously score the slush pump, but an excessive percentage gives an abrasive action that leads to serious mechanical trouble. Sand also is one of the poorest of all wall builders, and its presence forces the building of a much thicker mud wall than would be necessary with a high colloidal mud.

Machines for removing sand are in common use in drilling districts showing sandy strata that ordinarily give trouble. These machines, particularly the centrifugal type, are especially desirable where both gas and sand are present. They remove the gas as readily as the sand, and recently a machine of this type was used only for the removal of gas. The whirling action was effective in breaking up the mud particles that held the gas. Mud pumped into this well at 14 pounds per gallon returned weighing less than 11 pounds. The gas lightened the mud column to an extent that gave a very low safety margin.

Viscosity long has been the subject of controversy, and agreement on the measurement or significance is not general. It is accepted as the measure of the combined effects of adhesion and cohesion. Desirable drilling muds often become too viscous for use under certain conditions. It is possible to treat such muds and lower their viscosity to a point that will return them to service. Even the heavier muds may be reduced to a viscosity that permits their use in the deepest wells. A mud rich in colloidal material is easier to condition than a basically poor mud, and when the latter is brought to its best condition it fails to meet average requirements.



A full-fledged Christmas tree was used for handling mud under high pressure in the Old Ocean, Texas, field. Small chokes were used when it was necessary to hold a uniform pressure and a large volume was not required.

Specialization of Equipment Is Distinct Trend the Past Year

By FRANK B. TAYLOR, Staff Writer

IN a direct and concerted effort to exactly meet demands, drilling equipment is being designed to more exactly satisfy particular requirements than at any time during past years. Regional drilling conditions with specific problems, depths to be reached, and means of transportation have been influencing factors. The economy of the change is pratical through particular adaption, in which money is not tied up in excessive machinery or other equipment not needed more than a small share of actual operating time. In a manner the move might be an economic retrenchment in that the investment is to establish a more versatile line of equipment, and one that will show a decreased cost of operation. This move is becoming increasingly evident in all phases of drilling operation.

Matched Rig Setups

As compared with past years when possibly 12 completely matched rig setups were available to the operator, today the driller may choose from 30 or more units more specifically designed to meet certain conditions of strata and depth. Today's construction is designed and engineered to meet the operator's problems as he meets them in the field. By such ability of selection much capital previously bound up in 5000-foot machinery, when only a 3500-foot test was planned, is diverted to more practical channels. It is not conducive to practical economy to use an extra heavy piece of equipment to go to depths only slightly beyond the range of a light unit; and this has opened the market for the newer products.

In addition to the expediency of more accurately selecting major investments, there is a distinct movement to break away from individual pieces of equipment in rig and machinery. With greater explorative effort on the part of all independent and major firms, core drill and shot hole machines are completely portable, as are also some of the smaller drilling machines for comparatively shallow depths.

As weight necessarily increases with greater depth designation, the task of making equipment portable has been more difficult. These evident difficulties have been overcome in two manners. First, by unitizing pieces of equipment that are generally associated in drilling operations; and by mounting these upon a single base or skid. Two or three assemblies of this nature make for easy portability and comprise the complete ground equipment of a rig. Late engineering has made practical unitized and truck mounted equipment capable of drilling to 4000 feet or more under ordinary conditions.

Prime Mover Trends

Prime movers have come in for exhaustive analyses of their economic utility, with the result that new designs of particular merit have been placed in service.

Steam rigs working at pressures nearly twice those generally used have been constructed and field service has proven their ability. Conservation of steam and the utilization of all generated pressure, plus successful superheating and preheating, has made these units both flexible in operation and economic.

New types and designs of internal combustion power units, both vertical and horizontal, have proven entirely successful during the past year. Greater flexibility between power and drawworks, power and pumps or table, has been achieved through transmission improvement. Improvements have not been confined either to particular branches of rig machinery, or to particular groups of industrial engineers. The use of internal combustion engines continues to expand, with more of these rigs probably sold during the first five months of 1937 than any previous 12.

Fostered not many years ago by Mid-Continent operators, the trend toward standardization of various pieces of equipment is being broadened to include most branches of drilling machinery. In past years there were times when only one man in a company could assemble a complete string of tools at a location. This was because it was necessary for each individual part to mechanically supplement all other equipment; threads and other characteristics must match. Besides calling for special selection, the fact resulted in lost time and unfounded ex-

pense. Although the process of weeding out off-fitting material is not confined to the past year, the work is still being carried ahead in new equipment.

The northern Mid-Continent has seen the welding of 8⅝-inch casing on the floor. The work was done on Carter Oil Company's Miller 4, in the Crescent pool, Logan County, Oklahoma. The casing was electrically welded, no difficulty being experienced by operators. Joints were 40 feet in length, of 36-pound casing, held flush by clamps as joints were welded. Although the practice has been used in California and Texas, it had not previously been attempted in northern areas.

Alloy Use Spreads

The greater spread in the use of and a more generally acknowledged value of alloyed material of all kinds in oil field service has brought about a trend that very probably is only beginning to manifest itself. Casing and drill pipe to meet unusual stresses are being developed and tried successfully, and the opinion has been expressed that it is through the development of alloyed drillpipe that deeper wells will be economically practical in areas of possible 12,000-foot production.

As a side issue in considering alloyed materials, the working of such metal cannot be carried on as if the metal were customary steel. The granular formation of alloys limits the manner in which the alloy can successfully be applied to service. Particular care is necessary in treatment of alloy equipment, and special knowledge is required for heat treatment or welding. The latter will frequently effect a radical change in the characteristics of the alloyed material on one form or another. Heat treatment may so change the internal structure of an alloy that its usefulness is entirely lost by becoming embrittled or malleable.

Loading of equipment is accomplished with greater ease today and with more safety from damage to equipment. Raising of the truck front end permits a straighter pull on the winch. The drawworks and engine here have been mounted on a single skid base which aids in dismantling, rigging up and moving.

Geophysics vs. Geology

IS AN EDUCATIONAL PROBLEM

By H. LANDSBERG,
Assistant Professor of Geophysics,
School of Mineral Industries,
State College Park, Pennsylvania

IN some recent issues of The Oil Weekly, L. W. Blau (March 29, 1937) and O. L. Brace (April 26 and May 10, 1937) have discussed the interrelationship between geophysics and geology from the viewpoint of each of these two fields. There was agreement on both sides that cooperation of geologists and geophysicists is necessary and highly desirable. But a fundamental discrepancy was obvious as to the role that each of them should play in the use of data gained in oil prospecting. The geologist as well as the geophysicist tried to assign to the other party a subordinate position and to claim the leadership for their own field. In that respect both exponents of the conflicting viewpoints seemed to be very orthodox, to copy one of the terms that was frequently used in their discussion.

Cooperation Often Lacking

To an outside observer it seemed as if somebody was afraid to lose a job and wanted to justify his methods by pointing to mistakes that the "other" fellow had made in the past. But it is not at all surprising that people with fundamentally different training and methods of approach had come to a collision; in fact, similar things have occurred in recent years in other border fields between two sciences. The necessary cooperative spirit may perhaps be present in program, but it is often lacking in practice. While in principle everyone is willing to profit from experiences made in another field, the unification of bodies of knowledge derived from different lines of reasoning proves to be quite complicated. One of the major troubles which somebody encounters when moving along the boundary of two fields is the confusion of language, because every field of science has created during its past history its own more or less sacred and secret terminology. Moreover every penetration from one side to another is usually viewed with suspicion; and, if one is permitted to use a political analogy, a "speciality nationalism" has developed, apt to regard someone with a different background and training as a hostile penetrator, who should better stick to his own lot.

Dr. Blau touched in his discussion upon the remedy of the situation by urging a change in training of the future geologists. But it shall be stated that the future generation of geophysicists might as well stand a reorientation of its fundamental background. Too often we find geophysicists who are really mathematical or experimental physicists and who gained the prefix "geo" to their title not because they knew anything about the earth, but because they happened to be engaged in work where one of the measured physical quantities was a property of the earth. So still a good many so-called geophysicists should properly be termed just physicists and the label geophysicists is really justified for persons whose training and experience incorporates geology as well as physics. As for the geologist: it is quite true, as Dr. Blau has pointed out, that many geologists shun the mathematical approach to their science. In many of their deductions they rely on their past experiences and analogies. This method upon closer analysis obviously is a form of a somewhat defective and subconscious mathematical statistics. If then, as the geologists point out, relying on mem-

This discussion adds to previous ones published in The OIL WEEKLY on the relative position and importance of geophysics and geology.

ory or literature permits them already to approach structural problems successfully, should not the application of the more exact tools of modern science help further along?

The integration of the necessary knowledge for the geologist or physicist, who want to engage in geophysical work requires probably a longer training than what can be pressed into a four-year college curriculum. In those schools where geophysics forms a part of the instructional program five-year courses are usually offered. The writer had occasion to discuss the desirable training for geophysicists with men in the field, research workers, and academic teachers.

Necessary Courses

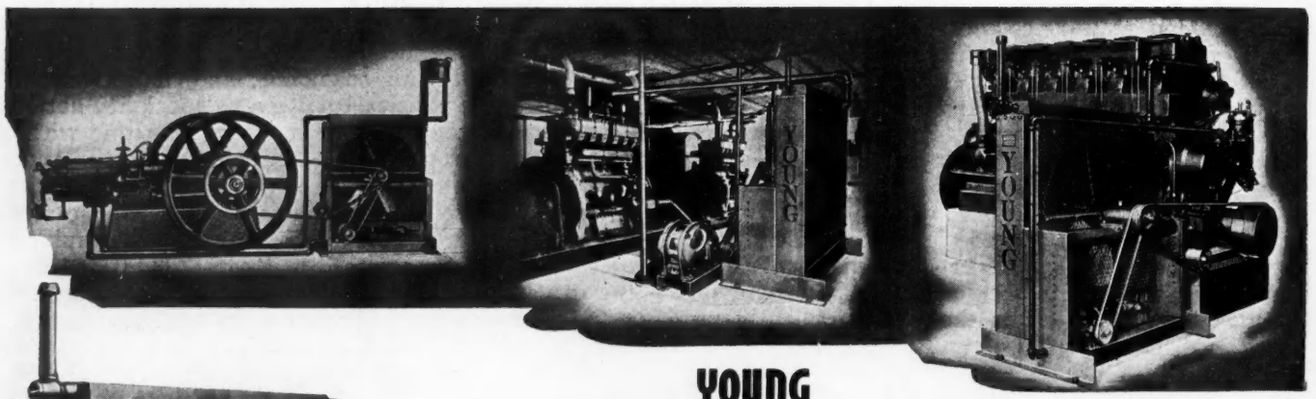
Besides the generally required cultural subjects the following courses were thought to be necessary:

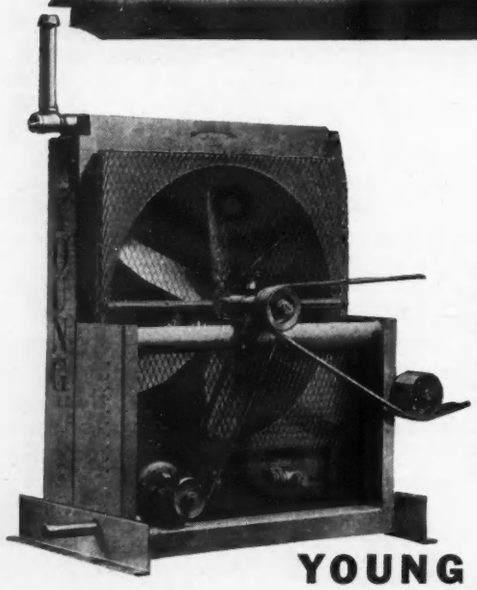
1. Mathematics: elementary courses followed by calculus, differential equations, vector analysis.
2. Physics: general physics and physical measurements followed by advanced courses in theoretical mechanics, electricity, and magnetism.
3. Geology: introductory geology, structural geology, economic geology, geologic mapping, invertebrate paleontology, stratigraphy.
4. Mineralogy: physical mineralogy, petrography.
5. Geophysics: general geophysics, geophysical instruments, geophysical prospecting.

The first four numbers in the list give nothing but fundamentals and most people in the field will agree that they form an acceptable background. The value of some courses as listed under number 5 has, however, been questioned by people engaged in practical prospecting work. Their argument is that the prospecting companies have developed their own practice and equipment and new men with a proper basic knowledge could readily be trained as soon as they enter the company. In spite of this opinion the educational value of at least some instruction in geophysics proper during the college period has to be emphasized. Principally a general course on geophysics would still involve the fundamentals of knowledge on the gravitational field, on seismology, and the earth's magnetic field. It is much easier for a young graduate entering a profession to orientate himself if he is at least familiar with the classical part of his science. And it should not be forgotten that the advance in geophysical prospecting had their antecedents in concepts gained through the study of the general physics of the earth. The same argument will hold for the knowledge of instruments. Even though colleges may not be in possession of the latest (usually secret) apparatus or process, a pendulum in spite of all possible improvements still remains a pendulum, and even the trickiest construction of a magnification system will not change the basic principle of a seismograph.

Combination Men Best

It is felt that a man of the outlined training will be best adaptable to practical geophysical work and easiest be able to adjust himself to the system used by the company employing him. The problem geologist vs. prospecting physicist will in future best be solved by joining the necessary knowledge in one man, who then will properly bear the title of geophysicist.





YOUNG
JACKET WATER COOLING SYSTEMS
2 Models — 8 Sizes
For Gasoline - Diesel Engines - Compressors and Similar Applications

These units have been designed to provide a recirculating cooling system to operate with any type of jacketed stationary or portable engine. They are ideal for engines in pumping service where water is difficult to obtain or where it contains impurities injurious to engine jackets. Young coolers are easily portable, self contained, including fan, water pump, bearings and drive. The fan may be engine driven or by a separate electric motor. Structural steel construction, with electric welding, the unit is built to stand the hardest service. Tanks, top and bottom are of heavy gauge copper with all joints brazed. Furnished in a range of sizes from 25 to 125 h.p. All sizes carried in stock and immediate shipment can be made.

Write for Catalogue giving complete engineering data and price list

YOUNG RADIATOR COMPANY
RACINE, WISCONSIN, U. S. A.

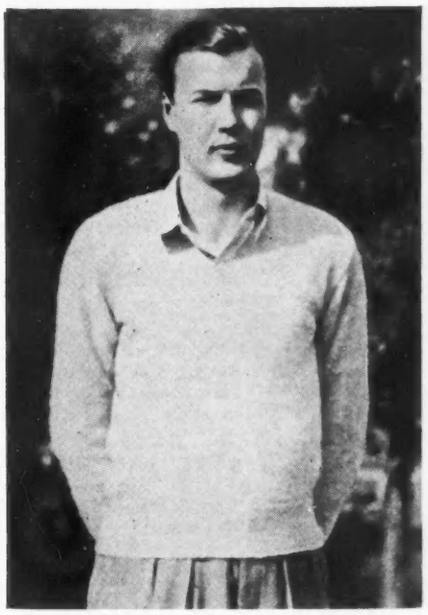
Young Quality

MEN IN THE INDUSTRY'S NEWS

HARRY F. SINCLAIR, JR., son of the chairman of Consolidated Oil Corporation, recently was elected a member of the board of directors, executive committee and the finance committee of the corporation. Sinclair, Jr., has been a student at Dartmouth College for two years, and has passed his twenty-first birthday. He is more than six feet tall and husky. He is leaving college on his own insistence, because, as he puts it, "I want to go to work."

Sinclair, commenting on his son's entrance into the oil business, said today:

"My son's election to the board does not mean that he is going to have a mahogany desk and a big salary. It is simply a part of his education. For some time he will listen and learn. He has worked in a filling station during his summer vacations and as a deck hand on our tankers. When he has completed his course as roustabout, pipe liner and in the refineries, it will be time enough to find out what his job is going to be. In the meanwhile, he will draw our common labor rate of pay and make his own way in the company on the same footing as any other employee. He will have plenty of opportunity to realize his ambition to go to work."



HARRY F. SINCLAIR, JR.
An executive to roustabout

S. F. SHAW, consulting engineer of San Antonio, is in Corpus Christi conducting gas-lift investigations for Westgate Oil Company.

BERNARD H. LASKY, geologist formerly of the consulting firm of Bates and Lasky, Tulsa, has opened offices in the Sterling building in Houston. Lasky recently spent several years doing mining examination and exploration in California and Mexico.

GUILLERMO SANCHEZ BARQUERA has been placed in charge of the legal department of Cia. Mexicana de Petroleo "El Aguila" S. A. at Tampico, Mexico. He succeeds Sergio Tulio Acuna, who was drowned April 7.

JOHN E. CARR has been appointed division land man for Humble Oil & Refining Company in the Corpus Christi district.

M. C. ROWOLD has succeeded John E. Carr as the man in charge of titles and records for Humble Oil & Refining Company at Houston.

JIM NOEL, for the past 3½ years with the production department of Vickers Petroleum Company, has been named scout in the Kansas district for the Atlantic Oil Producing Company, succeeding Bob Walls, who has been promoted to the land department.

S. D. JACKSON of Shreveport and his brother, W. J. Jackson, formerly petroleum engineer with Humble Oil & Refining Company in Houston, have opened offices in the Ricou-Brewster building in Shreveport as consulting mechanical and petroleum engineers. W. J. Jackson holds a degree from the Louisiana State University's school of petroleum engineering, while his brother graduated in engineering from the Stephens Institute of Technology in Hoboken in 1919. S. D. Jackson for a number of years was with Louisiana Oil Refining Corporation. Later he was with Arkansas Natural Gas Company. In addition to consulting work, the new firm of Jackson & Jackson will handle sales of flowing and production equipment and oil field machinery.

ROBERT L. MINCKLER
Heads Los Angeles Accountants

RUSSELL A. WEINGARTNER was the speaker at the weekly luncheon meeting of the Houston Geological Society June 10, and discussed the Turtle Bay field, Chambers County, Texas Gulf Coast.

HOWARD JOHNSTON, chief scout for The Texas Company at Tulsa, left early last week for Los Angeles, California, where he will vacation with friends.

H. E. BORGELT, formerly in the accounting department of Pure Oil Company, Tulsa, has been transferred to the Chicago offices of the company.

G. W. SELINGER, attorney and proration official, Skelly Oil Company, Tulsa, will be married June 20 to Miss Jill Armstrong of Houston. Following the ceremony, the couple plans to leave for a honeymoon in the Colorado Rockies.

WILLIAM J. KEMNITZER, petroleum technologist of Laguna Beach, Calif., has been commissioned a Lieutenant Commander in the U. S. Naval Reserve. Recently, Kemnitzer has appeared as expert witness for the federal government in ligitation involving naval petroleum lands in the Elk Hills, California, area.

JAMES TATTERSFIELD, JR., nine months old, may claim the world's baby air traveling record for he has completed five round trips between Mexico City and Tampico, via Tuxpan, a total of 2440 miles. His father is an oil company official in Tampico.

T. M. "PAT" REID, manager of the aviation division of Imperial Oil Company, Limited, on an inspection trip of Canadian airports, recently visited Edmonton, Alberta.

ROBERT L. MINCKLER, assistant to the president of the General Petroleum Corporation of California, was elected president of the Petroleum Accountants Society of Los Angeles at a meeting of the board of directors June 7. Minckler, who entered the employ of the General Petroleum Corporation in 1924 as a clerk in the accounting department, is also a director of the Kettleman North Dome Association. Other newly elected officers of the Petroleum Accountants Society include D. S. Kilgour, California Oil & Gas Association, first vice president; L. A. Williford, Macmillan Petroleum Corporation, second vice president; and W. A. Russell, Seaboard Petroleum Corporation, secretary-treasurer.. N. J. Allen, Lincoln Petroleum Corporation, and D. A. Moore, Wilshire Oil Company, replace Fero Williams, Geo F. Getty, Inc., and H. P. Huggins, Western Gulf Oil Company, retiring directors.

J. K. WADLEY and **H. L. HUNT,** Texas oil operators, have taken over the rich Jumbo gold mine in the Awakening district of Humboldt County, Nevada, with payment of $250,000 on a lease contract to the George Austin family. The payment may be applied on an option to

purchase the mine at a price set by agreement at $10,000,000, and to be exercised at any time during the next 20 years. Meanwhile $100,000 minimum annual royalty payments are to be made to present owners of the mine.

DR. FREDERICK G. CLAPP, consulting geologist of New York who recently returned from a 54-week stay in Europe and the Near and Far East, will sail for the Orient again about the middle of August.

JOHN R. DAVIS, assistant to the Texas-New Mexico division production superintendent for Magnolia Petroleum Company, Dallas, was utilizing his vacation the past week by journeying to New York to witness the graduation of his son from the Columbia University.

JAMES WILLIAM BROUGHTON, former chemist with Imperial Oil Company, Limited, at Calgary, Alberta, has been awarded a Doctor of Philosophy degree by McGill University, Montreal.

A. J. RENAUD, who recently resigned after 10 years with Continental Oil Company land department, has moved from Lake Charles, Louisiana, to Fort Worth, Texas, where he will engage in a private oil business.

DAN MORAN, President of the Continental Oil Company, leading a party of 25 officials on a tour of company properties, stopped in Cheyenne, Wyoming, last week. The tour will include southern and eastern states before the party returns to New York.

HARRY C. GUISEWITE, for 37 years with the Oil Well Supply Company at Oil City, Pennsylvania, was retired by the company May 27, his seventieth birthday.

ROBERT H. COLLEY, of Philadelphia, recently elected president of Atlantic Refining Company, was a recent Houston business visitor. He was accompanied by W. M. O'Connor, vice president in charge of foreign production for the company, and also of Philadelphia; and by E. H. Blum, vice president in charge of domestic production, with headquarters at Dallas. Under the guidance of W. C. Coolidge, division manager of Atlantic Refining Company at Houston, they inspected the concern's holdings in Southwest and Texas Gulf Coast.

DR. JOSEPH E. POGUE, vice president of Chase National Bank, New York, and head of the bank's department of petroleum economics, was in Houston last Tuesday.

W. P. LEE, chief of the guards at the Standard Oil Company of Louisiana's plant at Baton Rouge, was the principal speaker at the May meeting of Holmes Safety Association at Baton Rouge.

ING. MANUEL SANTILLAN, late manager of the defunct Petromex, the semi-official oil company of Mexico, recently went to the United States on a government oil mission.

WALTER G. TSCHUDIN, vice president and general manager of Mexican Sinclair Petroleum Company, is Mexico's champion air traveler. He has made 100 round trips by plane between Mexico City and Tampico, a total distance of 43,000 miles.

Ohio Oil Company Picnic

Bristow, Okla. — Ohio Oil Company employes numbering 1200 assembled here June 5 for the sixth annual company picnic. Representatives from Kansas and Texas as well as Oklahoma offices of the concern were present.

PETER P. SNIC, junior safety instructor with the United States Bureau of Mines, is conducting a two weeks' safety course and first aid school for employes of E. H. Moore, Inc., in the Fitts and Bebee districts.

DIED:

SAMUEL RICHIE, 55, production manager for W. C. McBride Company, died June 3 in a Vincennes, Indiana, hospital following a paralytic stroke. He had been connected with the McBride company for 25 years. Survivors include his wife and 11 children.

GEORGE EARL WYNN, 48, oil operator in the Wichita, Kansas, vicinity for 15 years, died May 29 in a Wichita hospital. A World War veteran, he received two gold chevrons for gallantry in action at St. Mihiel and in the Argonne. Survivors include his wife, his mother and two brothers.

Petroleum group of chemists hold meet in Bartlesville

Bartlesville. — The petroleum group of the Oklahoma section of the American Chemical Society held its last meeting here June 12, at which time members of the organization were guests of the Bureau of Mines, which held open house for the visitors. Following a tour of the new building erected at the station and a buffet luncheon, the group heard Dr. Robert E. Burk, Western Reserve University, who spoke on "Observations on the Polymerization of Hydrocarbons."

Twenty young engineers hired by Texas Commission.

Twenty young engineers, just out of Texas engineering schools, have gone to work for the Texas Railroad Commission, with their first assignment a survey of the state's gas wells.

In hiring these engineers the commission followed a policy established about three years ago. "We believe we have a splendid group of young men," Chairman C. V. Terrell said in announcing the list.

All the new employes have engineering degrees and most of them have had some oil field experience, largely as summertime roustabouts. The men are:

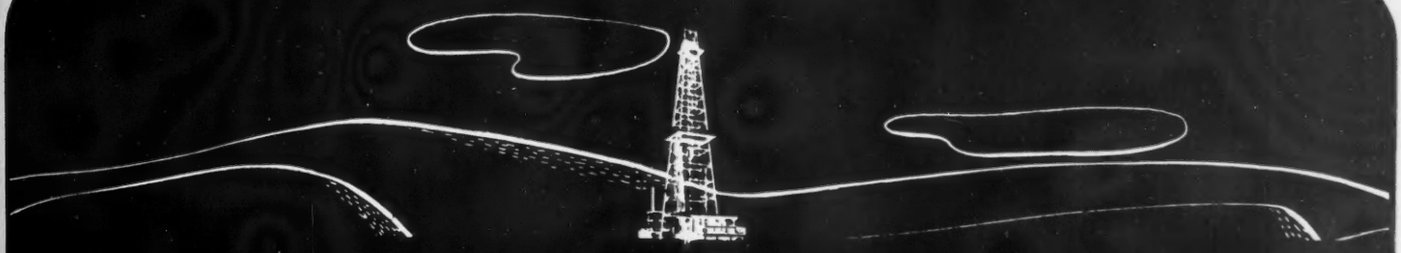
From the University of Texas: Leo D. Recknagel, Victoria; Jack Baumel, Austin; W. H. Lewis, San Antonio; Sol Smith, Tyler; Lynn W. Strong, Austin; Bob Keen, Karnes City; Frank Gardner, Alice; Denny C. Irey, Big Springs; Roland Couldy, Amarillo; Weldon Porter, Hillsboro.

From Texas A. & M. College: J. B. Lyon, Buffalo; James G. Hall, Jr., Houston; Robert E. Adair, Crockett; W. G. Middleton, Jr., Bryan; McGehee Word, Alice; T. G. Post, Montgomery; Roy L. Cochran, Henderson.

From Texas Tech: Morgan Gist, Colorado; A. C. Stults, Clarendon.

From Texas Arts and Industries: John W. Kellam, Robstown.

Distributed throughout the Mid-Continent and Gulf Coast by
BAROID PRODUCTS
(see opposite page)
BRIDGEPORT
For quick service on any quantity or any type of Drilling Mud, telephone the nearest Bridgeport Store, Office or Representative—day or night.
THE BRIDGEPORT MACHINE COMPANY
HOUSTON . DALLAS . SAN ANTONIO . CORPUS CHRISTI . ODESSA
SHREVEPORT . TULSA . OKLAHOMA CITY . WICHITA . and Branch Stores



We are pleased that

BAROID PRODUCTS

have helped overcome some of the many drilling difficulties encountered in the world's deepest wells

BAROID PRODUCTS

BAROID-Extra-Heavy Colloidal Drilling Mud. • AQUAGEL Trouble-Proof Colloidal Drilling Mud. • STABILITE—An Improved Chemical Mud Thinner. • BAROCO—An Economical, Salt Water-Resisting Drilling Clay. • FIBROTEX—For Preventing or Regaining Lost Circulation in Drilling Wells.

Stocks carried and service engineers available in all active oil fields

BAROID SALES DEPARTMENT

NATIONAL PIGMENTS & CHEMICAL DIVISION OF
NATIONAL LEAD COMPANY
BAROID SALES OFFICES • LOS ANGELES • TULSA • HOUSTON

Re-Elect Expo Officers

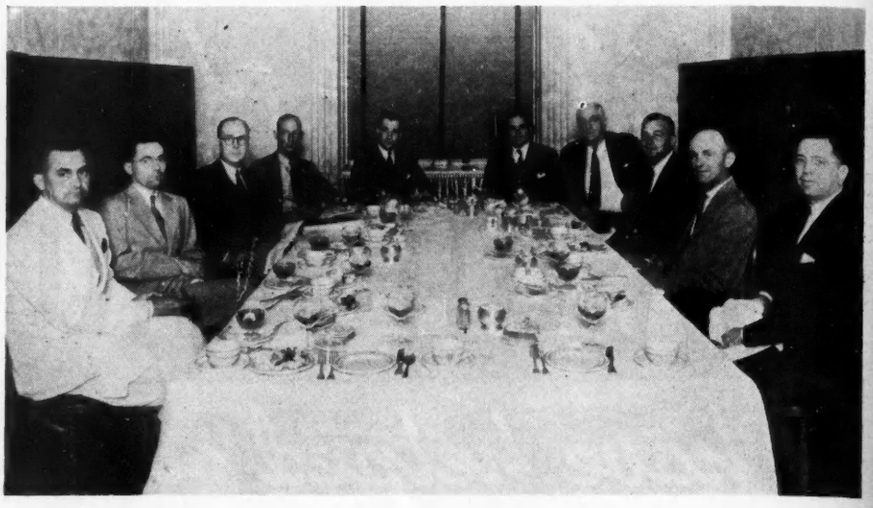
[*Contined from page 41*]

meetings sponsored by sub-committees of the exposition.

Besides the officers the executive committee of the organization is to be composed of the following: S. P. Brown, vice president, Hughes Tool Company, Houston; Joe Russell, Gulf Oil Corporation, Houston; W. B. Sharp, president, Mission Manufacturing Company, Houston; and Frank Carothers, vice president of Norvell-Wilder Supply Company, Houston.

Board of Directors

All members of the executive committee were elected to the board of directors, and in addition the following: V. E. Ashford, Parkersburg Rig & Reel Company, Houston; Richard Bloss, International Derrick & Equipment Company, Beaumont; A. I. Brainard, Beaumont Iron Works, Beaumont; Al Buchanan, drilling contractor, San Antonio; S. T. Childress, Rio Bravo Oil Company, Houston; H. J. Craig, Baash-Ross Tool Company, Houston; John T. Crotty, Republic Supply Company, Houston; W. H. Curtin, W. H. Curtin Company, Houston; K. W. Davis, Mid-Continent Supply Company, Fort Worth; T. J. Donoghue, The Texas Company, Houston; J. B. Fleming, Houston Lighting & Power Company, Houston; Julius Fohs, Fohs Oil Company, Houston; H. W. Gwilliam, Ohio Oil Company, Houston; Harry C. Hanszen, Esperson Building, Houston; R. H. Hargrove, United Gas Public Service Company, Houston; L. O. Koen, W-K-M Company, Inc., Houston; Gage Lund, Standard Oil Company of Texas, Houston; A. M. McCorkle, Stanolind Oil & Gas Company, Houston; D. B. McDaniel, Gulf Coast Drilling & Production Company, Houston; A. T. McDannald, Smith & McDannald, Houston; Robert J. Miller, Robert J. Miller Company, Houston; H. W. Millmine, Texas Rubber & Specialty Corporation, Houston; C. B. Moore, Frick-Reid Supply Corporation, Houston; Dan Moran, Continental Oil Company, Houston; R. A. Muller, Gray Tool Company, Houston; C. E. Naylor, Maintenance Engineering Corporation, Houston; Martin O'Brien, Republic Production Company, Houston; George O'Leary, Houston Oil Field Material Company, Houston; R. W. Pack, Sun Oil Company, Beaumont; J. R. Parten, Woodley Petroleum Company, Houston; C. R. Patterson, National Supply Company, Houston; Louis Pearce, Texas Iron Works, Houston; Tom Pew, General Crude Oil Company, Houston; M. W. Phelps, Oil Well Supply Company, Houston; Ed Salrin, Tide Water Associated Oil Company, Houston; H. J. Swope, Magnolia Petroleum Company, Beaumont; T. E. Swigart, Shell Petroleum Corporation, Houston; J. H. Teer, Layne & Bowler Company, Houston; F. H. Thrailkill, Continental Supply Company, Houston; W. C. Trout, Lufkin Foundry & Machine Company, Lufkin.



A recent meeting of the executive committee of Oil-World Exposition, Inc. Left to right: Ed Lenzner, general manager; Fred Allen, auditor; Ray L. Dudley, secretary-treasurer; Frank Carothers, member executive committee; John R. Suman, president; George A. Hill, Jr., vice president; W. L. Childs, vice president; S. P. Brown, member executive committee; Chase Sutton, executive vice president; and Wallace Wilson, vice president

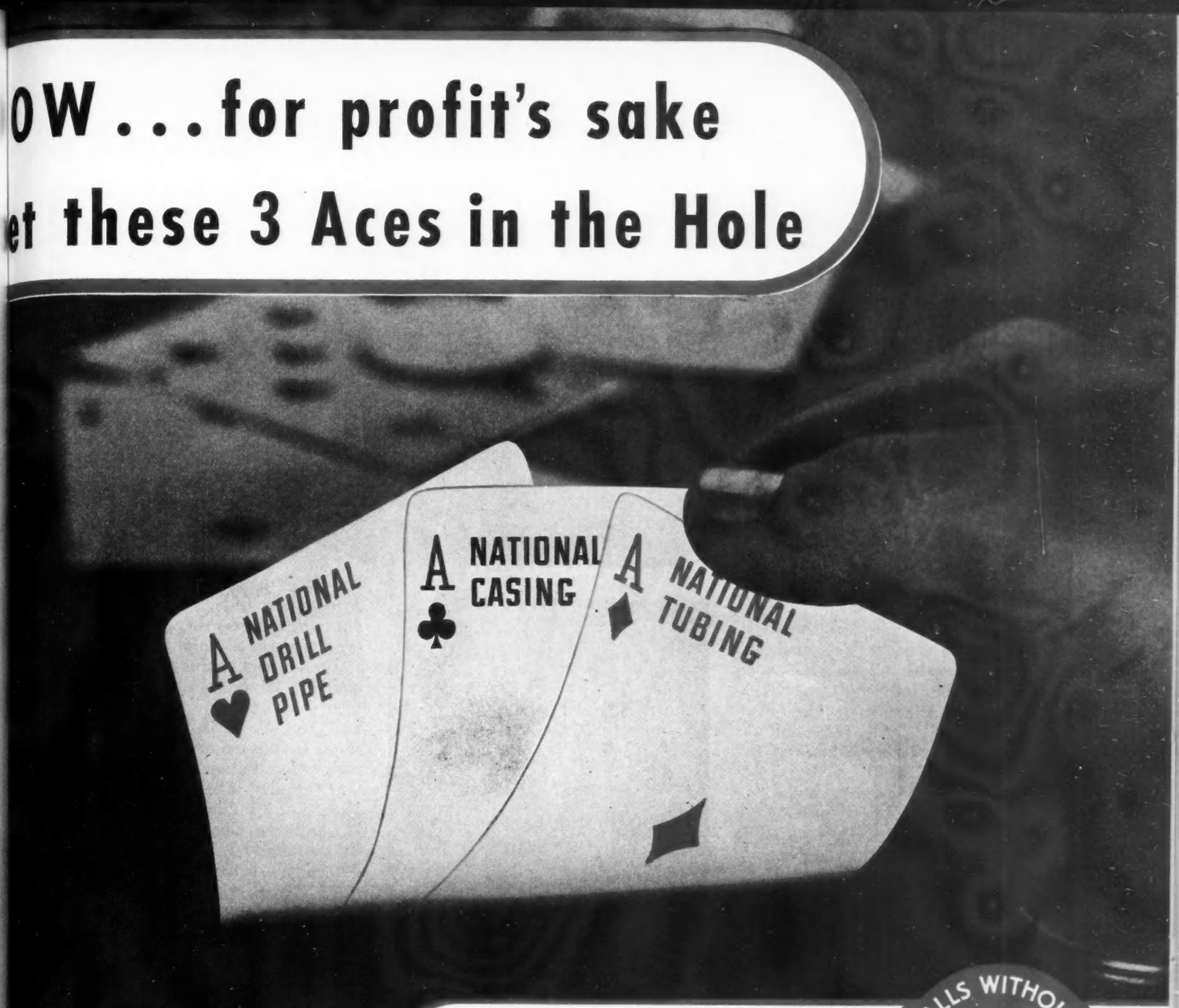
Exhibit Space Increased

Although the new $1,337,000 Convention Hall is 40 percent larger and has over 100,000 square feet of total floor area, it has already become necessary to obtain more space to display the equipment that will be exhibited at the Oil-World Exposition to be held in Houston October 11 to 16, 1937. Following a recent meeting of the board of directors, John R. Suman, president of the exposition, announced that it had been voted to increase capacity to take care of the many applicants for space who were unable to obtain such space in the main exhibition building. To accomplish this, contract has been signed for rental of five vacant city blocks of park board property which are adjacent to the main exposition building.

More than 200 additional exhibiting spaces will here be provided by the erection of one of the largest tents in the country. This tent is completely waterproof and will have a wooden floor, electric outlets, booth partitions, signs, water, gas and all other facilities exactly like those in the exposition building. Moreover, the main entrance to the oil show will be through this tent and all access to the convention hall, meeting and convention rooms, demonstration spaces and outdoor exhibits will be via this tent.

NATIONAL TUBE Pipe
(see opposite page)
Distributed throughout the Mid-Continent and Gulf Coast by
BRIDGEPORT
For prompt out-of-stock or carload deliveries of National Tube Pipe of all kinds, phone the nearest Bridgeport representative—station to station.
THE BRIDGEPORT MACHINE COMPANY
HOUSTON . DALLAS . SAN ANTONIO . CORPUS CHRISTI . ODESSA
SHREVEPORT . TULSA . OKLAHOMA CITY . WICHITA . and Branch Stores

ow . . . for profit's sake
et these 3 Aces in the Hole



NATIONAL SEAMLESS
DRILL PIPE · CASING · TUBING

NATIONAL Seamless Drill Pipe . . . NATIONAL Seamless Casing . . . NATIONAL Seamless Tubing . . . with these three aces in the hole, you are bound to come out a winner.

DRILL PIPE—Drillers are performing amazing feats of control every day in making straight hole in deeper depths or in directional drilling — work not dreamed of some years ago. To the high quality of NATIONAL Seamless A.P.I. Drill Pipe goes a large share of the credit, because it gives the means of dependable control and transmission of power from the rotary table to the bit.

CASING—The uncertain conditions of running and cementing—the possible emergencies that may and frequently do arise, very definitely make reliability the first consideration. No other factor has a greater bearing on reliability than uniform, dependable wall-strength. NATIONAL Seamless A.P.I., Diamond BX and Diamond B8 Casing, being pierced from a solid billet of steel, (Walls Without Welds), has uniform wall-strength and the highest degree of dependability.

TUBING—When the well goes on the pump, NATIONAL A.P.I. Seamless Tubing will materially aid in economical operation. Heavy, upset ends give this tubing the extra strength and security where most needed and afford abundant wearing metal that permits it to be made up and broken down time after time.

For profitable drilling, casing and tubing of wells, play safe with these three aces in the hole, NATIONAL Seamless—*America's Preferred Drill Pipe, Casing and Tubing.*

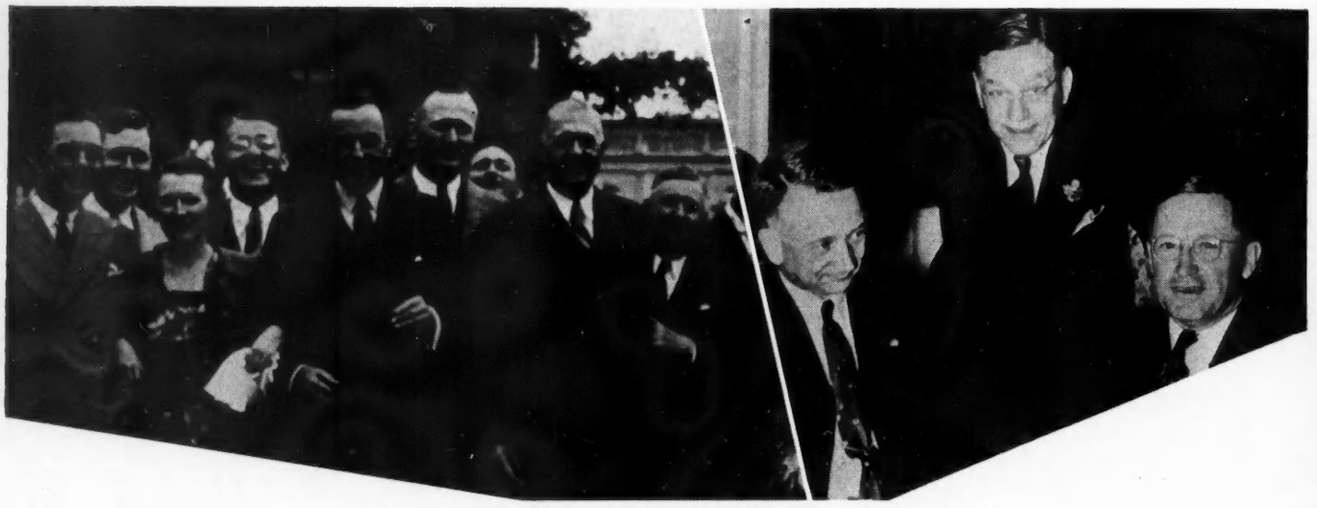
NATIONAL TUBE COMPANY

PITTSBURGH, PA.

United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

Some Scenes From the A. P. I. Mid-Year Meeting at Colorado Springs

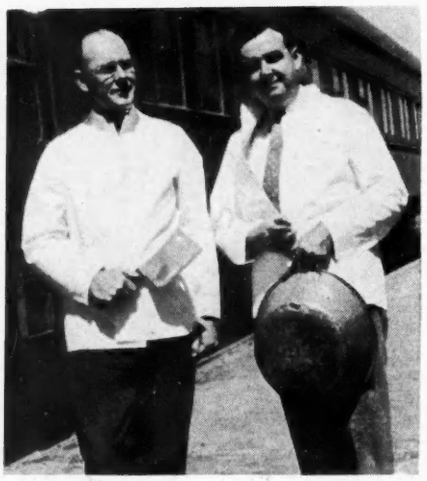


While much work transpired during the four-day meeting, there was still time for a few pleasant "get togethers."

The photograph at the top left shows a group at the Spencer Penrose cocktail tea. From left to right: C. D. Watson, Carter Oil Company, Tulsa; Ernest Kappenback, Oil & Gas Journal, Tulsa; P. C. Lauinger, Oil & Gas Journal, Tulsa; Spencer Penrose of Colorado Springs; Rex Hamaker, Reed Roller Bit Company, Houston; Bob Miller (peeking over Hamaker's shoulder), Robert J. Miller Company, Houston; Dick Lewis, Norvell-Wilder Supply Company, Houston; and Hu Harris, Humble Oil & Refining Company, Houston.

In the bottom left picture, Carl Reistle, Humble Oil & Refining Company, Houston, is shown in the left foreground, with H. R. Straight, The Empire Companies, Bartlesville, at the extreme right.

The center picture shows two men who have won the title of "Oil Industry's Star Chefs." They are left to right: Ray L. Dudley, Gulf Publishing Company, Houston; and Walter Trout, Lufkin Foundry & Machine Company, Lufkin, Texas. Due to washouts the train returning from Colorado Springs was delayed, and when weary travelers awoke Friday morning they discovered only one darky in the diner—and he was a waiter and not a chef. So Dudley and Trout went to the kitchen. After a few orders everything turned out to be scrambled eggs and ham. But everyone was fed and in fine fashion.



The top right hand picture might be entitled "20 years later." The gentlemen were in California 20 years ago and are shown here recalling those times. Left to right: W. W. Scott, Humblue Oil & Refining Company, Houston; Stanley Durward, Shell Petroleum Corporation, Houston; and A. W. Ambrose, The Empire Companies, Bartlesville.

At the bottom right is a group during the banquet. Around the table from left to right are: Harry Morlang, National Tube Company; George Gibbons, Mid-Continent Oil & Gas Association of Texas; George Hayes, Oil Well Supply Company; Eugene McElvaney, First National Bank of Dallas; Jake L. Hamon, of Cox and Hamon, Inc.; Edwin B. Cox of Cox and Hamon, Inc.; and Ray L. Dudley, Gulf Publishing Company.

All photographs by Gene Raymond of Black, Sivalls & Bryson, except the center one, which was snapped by Pete Little of Lufkin Foundry and Machine Company.

WORLD DEVELOPMENT and TECHNOLOGY

Edited by
WM. V. GROSS, Associate Editor

Strike Is Ended

CARDENAS ORDERS MEXICAN WORKERS BACK TO JOBS

JUNE 5, President Lazaro Cardenas of Mexico stated the strike of oil workers in Mexico would come to an end June 7. On the latter day labor faction leaders representing some 18,000 workers of the oil industry voted to go back to work while a federal conciliation board took over the job of arbitrating strike demands made of Mexico's oil industry. On June 8, oil industry workers in Mexico were ordered back to work.

The order of events is something of a denial and confirmation of prediction made by students of the oil industry in Mexico of what the attitude of Cardenas in the matter would be. They had predicted that he would not tolerate the general strike, which was called and allowed to run for 11 days, because of the crippling effect such a strike would have on government coffers. On the other hand, his apparent active part in having the strike stopped indicates those making the original prediction knew something of his feelings in the matter.

It is believed in Mexican oil circles that the oil companies will grant the demands of the laborers' representatives for a 40-hour week, an increase in wages, and vacations with pay.

Early in 1937 it was predicted the year's production would exceed that of 1936, provided there were no serious interruptions in the function of the industry through strikes and other troubles. So far, 11 days interruption is not serious, as things have gone in Mexico. So, possibility of production in excess of 44,000,000 barrels in Mexico this year still is not remote.

Japan Output Up

TWO FIELDS IN PREFECTURE OF AKITA ARE RESPONSIBLE

ACCORDING to the figures just returned by the mining bureau of the department of commerce and industry of Japan and Hokkaido the amount of petroleum produced by the major fields for 1936 reached 3,820,462 hectolitres, an increase of approximately 30 percent compared with 2,935,053 hectolitres for the previous year.

The above increase was largely due to the two fields of Omonokawa and Yatsuhashi, both in the prefecture of Akita, these two contributing 396,127 hectolitres. The amount contributed by lesser fields is returned at approximately 300,000 hectolitres. The gross output was the highest since 1917, when the record of 4,526,133 kilolitres was registered. From that year on the output steadily declined until a record low of 225,500 kilolitres was reached in 1933.

The output of natural gas for 1936 reached 37,188,200 cubic meters comparing with 2,609,400 cubic meters for the previous year.

Production in Hokkaido and Niigata has shown a steady drop. Relative figures appear in the accompanying table.

Plan for North Saghalien

The production increase of different oil wells of the North Saghalien Oil Company in the fields leased by the company from the Soviet government during the coming five years is estimated to total 1,740,000 metric tons during the period, according to the development plan now being drafted by the company experts.

Expenditures needed for the new exploitations will be furnished by the Japanese government in the form of a subsidy, if an appropriation of 20,000,000 yen for this purpose is approved at the diet soon in session.

Production increase as planned by the North Saghalien Oil Company in the coming five years, over which period the company's lease was extended in the Moscow negotiations last year, is detailed as follows:

Planned Production Increase in North Saghalien Oil Company's Oil Fields in North Saghalien

1937	220,000 metric tons
1938	280,000 metric tons
1939	340,000 metric tons
1940	400,000 metric tons
1941	500,000 metric tons
Total	1,740,000 metric tons

Crude Oil Production in Japan and Hokkaido
(Hectolitres)

Hokkaido:	
Atsuma	42,460
Ishikari	69,705
Akita:	
Toyokawa	253,448
Asahikawa	196,417
Yuri	66,354
Kokura-Toyokawa	23,308
Nakano-Kokuni	229,355
Dai-Nippon-Kokuni	31,019
Innai	436,959
Yabase	994,690
Asahi-Innai	121,623
Omonogawa 1	42,794
Omonogawa 2	396,127
Niigata:	
Niitsu	366,531
Nishiyama	344,107
Higashiyama	115,330
Ohmo	67,612
Nanokaichi	8,858
Kubiki	13,764
Total	3,820,462

AGUILA'S NEW OFFICE

The new block-long building of Compania Mexicana de Petroleo El Aguila, S.A., in Mexico City is scheduled for completion in two months. The building, located on Madero Avenue between Humboldt and Iturbide streets, is of Spanish colonial style, with rose windows as relief.

11,300-FOOT GOAL

Kinsui 32 of Nippon Oil Company drilling ahead

NIPPON OIL COMPANY'S Kinsui 32, Kinsui field, deepest test in Japan, has been having trouble cementing casing and coping with high pressures encountered in deep search for oil production.

K. Uyeno, in charge of operations, writes The Oil Weekly that 6⅝-inch casing was cemented with 300 sacks at 10,467 feet in an effort to shut off water. Owing to high temperatures, Uyeno says the cement hardened too quickly, clogging up the mud discharge pumps.

"In the United States operators are fortunate to be able to obtain a special cement for such purposes, but here in Japan we have no such recourse," Uyeno stated. So after cleaning cement out of the casing, the crew pumped an additional 300 sacks of cement into the well on the outside of the 6⅝-inch casing.

Forty-pound, 8⅝-inch casing was cemented in Kinsui 32 at 7420 feet, and the 6⅝-inch was run in without underreaming the 3047 feet of open hole below the larger casing. Circulation, at the rate of 150 barrels per hour, was started at 2000 pounds pressure.

Nippon Oil Company originally expected to reach sands productive of oil at 10,000 feet, but, Uyeno says, judging from core samples, it will be necessary to drill down to about 11,300 feet before a productive horizon can be contacted. These, if contacted, are expected to correspond to those from which oil is obtained at 1500 feet in the adjoining field of Shukkoko.

In the southern part of the island, Nippon Oil Company is drilling a "pressure drilling" well in one of the fields. On this test the crew is using a heavy mud of 1.67 gravity and a mud delivery pressure held to about 400 pounds. In this test drill pipe stuck at 3600 feet, about 400 feet below the shoe of 11¾-inch casing set to shut off gas sands above. However, the drill pipe was fished out, notwithstanding the high pressures, and drilling has been resumed.

Now—
Not 1 Nor 2 Nor 3 But
5
RECTORHEADS
1 Type "EH" 10,000 lb. test (Forged Steel)
2 Type "H" 6,000-lb. test (Forged Steel)
3 Type "M" 3,000-lb. test (Cast Steel)
4 Type "L" 1,500-lb. test (Cast Steel)
5 Type "C" 1,000-lb. test (Semi-Steel)
A TYPE AND TEST PRESSURE FOR EVERY REQUIREMENT!
Now there's a RECTORHEAD available regardless of what your pipe program may be. As the Type "EH" (with ASA flange) meets the highest pressure requirement of the times, Type "C" puts RECTORHEAD in the low price field . . . . Yet all 5 types have those features of outstanding quality that made RECTORHEAD the successor to the braden head.
RECTOR WELL EQUIPMENT CO., Inc.
FORT WORTH, TEXAS
Wichita Falls Midland Tulsa Shreveport Houston Corpus Christi

FIGHT 40-HOUR WEEK

Alberta field workers sign petition objecting

Oil operators will vigorously oppose establishment of a 40-hour week proposed by the provincial government department of labor for workers in Turner Valley and other Alberta oil fields of Canada, it was decided at a meeting of the Oil & Gas Association of Alberta held at Calgary recently.

Rather than risk drilling with inexperienced drillers if the government should seek to enforce a five or six-day week, operators will shut down one or two days a week, representatives of more than 40 drilling companies active in West Canadian fields reported. Members of the association empowered President Herbert Greenfield to present their case to Hon. N. E. Tanner, minister of lands and mines, to Premier William Aberhart, and to the provincial employment commission, together with a petition signed by 350 members of drilling crews also urging non-introduction of the proposed 40-hour week.

F. P. Byrne, Anglo-Canadian Drilling & Development Company, one of the largest drilling companies operating in Western Canada, declared that an Oklahoma drilling company, Manning and Martin, planned to operate four rigs in Alberta but withdrew when informed of the proposed 40-hour week which they said had been tried unsuccessfully under the NRA in Oklahoma.

Royalite Oil Company, largest Alberta operating company, has introduced the 40-hour week in all branches except drilling. J. H. McLeod, company president, explained introduction of a five-day week plan in drilling crews would necessitate four crews on each well instead of three, while introduction of a six-day week would require one extra crew on each two drilling rigs. A shortage of experienced drillers has made it necessary to import men from the United States and establishment of a short week would further increase the cost of drilling, it was pointed out.

Eastern Crude Raise

PENNSYLVANIA GRADES ARE HIKED 15 CENTS A BARREL

THE upward movement of crude oil prices that began in late May with the 8-cent increase in East Texas was extended last week to embrace Pennsylvania grade crudes.

Furthermore, there were various indications that the price raising soon would become even more general and embrace California as well as the Mid-Continent.

The hopes for such a general upward revision were not dispersed, moreover, even by the unfavorable implications of a reduction of tank wagon and dealer prices by Standard Oil Company (Indiana) in its wide territory.

The opinion persisted that conditions were about right for a general crude price increase, and that the gasoline market would satisfactorily adjust itself to higher crude postings, particularly in view of the fact the season of heavy consumption now is opening.

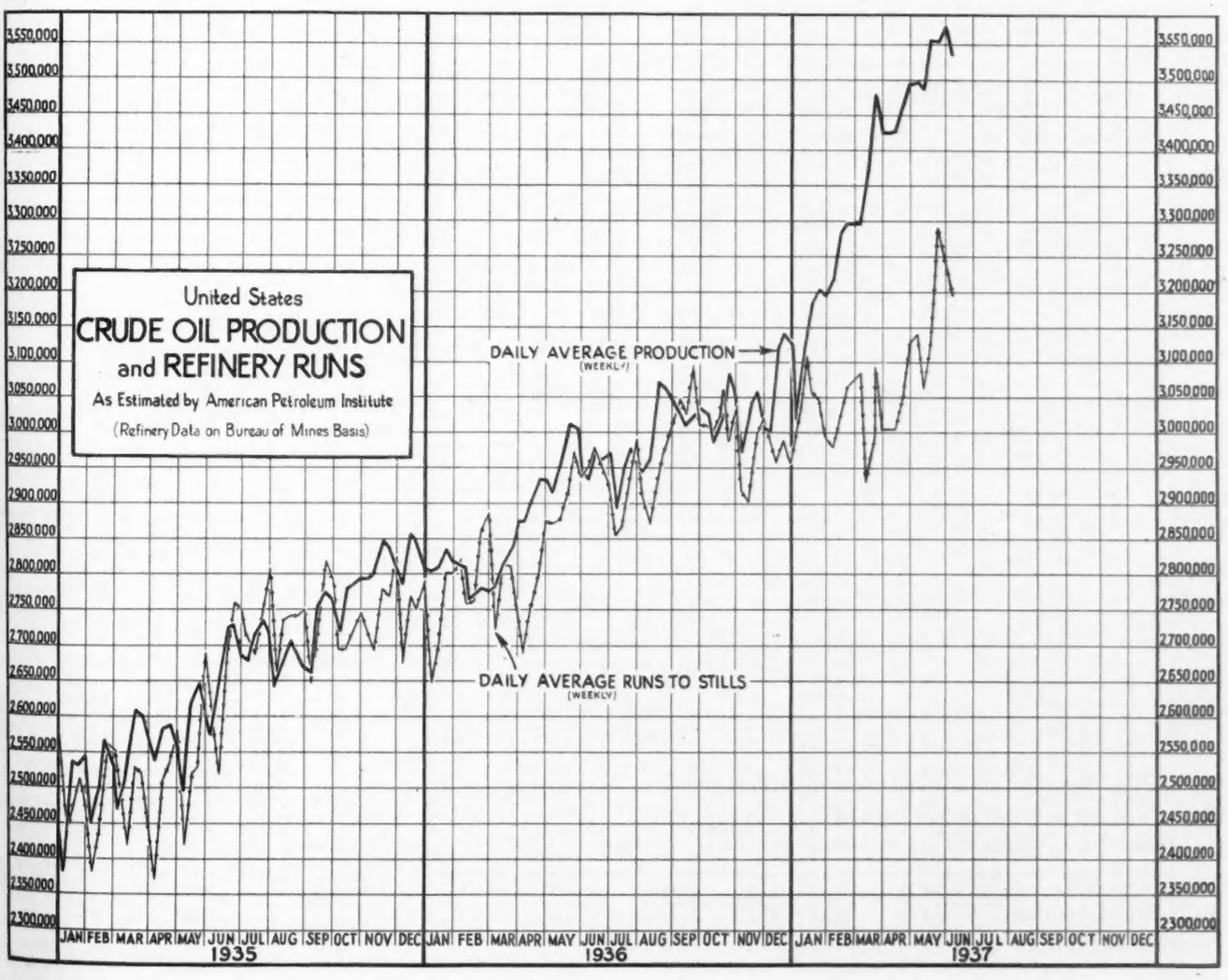
Stimulating the hopes for higher crude prices in the Mid-Continent were additional reports of continued keen competition among purchasers for East Texas well connections. Even following the small increase of late May, there has been considerable paying of premiums above the regular postings for the East Texas crude. Last week's reports indicated that the premiums ranged up to 10 cents a barrel.

To some extent, the strength of the East Texas crude market is local, since the oil from that field is highly desirable for making gasoline, and since gasoline requirements currently are running high.

Nevertheless, East Texas is a part of the Mid-Continent region, and demand that cannot be fulfilled in East Texas eventually must be satisfied in adjacent sections of the Mid-Continent, and the markets in those other areas will be strengthened thereby. Thus the strong market in East Texas augurs well for the rest of the Mid-Continent.

California Market Strong

In California, too, there is persistent talk of the possibility of an early increase in crude postings. California did not share in the general advance of January, this year, and it is felt that the



state should participate in the upward movement that now is in prospect.

A serious obstacle in the way of an advance for California is the fact that the voluntary proration program of the state has not held crude production down to desired levels. Output has been substantially above the limits prescribed in the operators' program as well as the estimates of demand as determined by the Bureau of Mines. The control program recently has been made less successful, moreover, by the development of the new Wilmington field, which has been difficult to hold in line.

Nevertheless, the impression is given that California crude prices are likely to be advanced in the near future.

Back of all the agitation for a general crude price advance is a healthy general situation in the oil industry. The industry occupies a highly favorable inventory position, despite recent substantial additions to crude storage. The crude stocks at present are about 10,000,000 barrels smaller than at this time last year. Yet demand for petroleum has been running around 10 percent higher this year than last year. This situation in which crude stocks are lower while demand is greater naturally promotes a strong crude market.

Furthermore, for the immediate future it is indicated that a virtual balance will prevail between crude production and demand. At any rate, such a balanced situation is in prospect until the end of June, under the present relatively strict production allowables in the leading producing states.

Pennsylvania Prices

	Flat Price	Date Posted
Bradford-National Transit	$2.82	6-7-37
Sw. Pa. Pipe Line	2.57	6-7-37
Eureka Pipe Line	2.52	6-7-37
Buckeye Pipe Line	2.37	6-7-37
Corning Grade	1.42	6-7-37

Complete table of prices paid for crude oil at the well in principal fields will be found on page 70, The Oil Weekly, June 7, 1937. Hereafter this schedule will appear only in the first issue of each month.

Crude Stocks Increase

The prospects for better adjustment of production to demand for this month tends to overshadow recent unfavorable statistics showing protracted additions of crude to storage. For the week ended May 29 was another addition of 774,000 barrels to crude oil storage, making the increase for May about 2,500,000 barrels. However, it is indicated that June will not bring any material net addition to the crude stocks.

Gasoline Stocks Down

The trend of gasoline stocks continues satisfactory. For the week ended June 5 there was a further withdrawal of 1,264,000 barrels from the gasoline storage, leaving on hand a total of 77,494,000 barrels of finished and unfinished gasoline. That quantity was but 9.7 percent larger than the 70,639,000 barrels of gasoline held on June 6, 1936. The increase of 9.7 percent in the gasoline inventories over a year ago is justified by the gain that has occurred in gasoline consumption. The gasoline demand so far this year has been running around 10 percent higher than last year.

Pennsylvania Increase

The Pennsylvania crude price increase of last week, effective June 7, pushed all prices 15 cents higher except that for Corning grade, which was left unchanged at $1.42 a barrel. All purchasers participated in the upward revision.

This increase lifted prices of all grades of Pennsylvania crude, except Corning, to the highest levels in more than seven years. It was the seventh successive advance since September 6,

Weekly Trends of United States Production and Stocks

(Figures American Petroleum Institute, except Crude Stocks, Bureau of Mines)

WEEK ENDED	Crude Oil Production (Barrels Daily)	Crude Runs to Stills (Barrels Daily)	Crude Oil Stocks (Barrels)	Gasoline Stocks (Barrels)	Gas & Fuel Oil Stock (Barrels)
January 2, 1937	3,121,400	3,030,000	287,659,000	62,661,000	106,330,000
January 9	3,117,800	3,110,000	286,912,000	65,402,000	105,971,000
January 16	3,184,650	3,045,000	286,044,000	66,559,000	104,841,000
January 23	3,205,150	3,055,000	285,211,000	68,180,000	103,441,000
January 30	3,194,050	2,995,000	285,384,000	69,540,000	102,078,000
February 6	3,220,750	2,980,000	286,116,000	70,535,000	101,136,000
February 13	3,286,050	3,020,000	286,158,000	73,585,000	100,735,000
February 20	3,295,950	3,065,000	287,574,000	74,798,000	99,391,000
February 27	3,296,100	3,085,000	288,121,000	78,786,000	99,534,000
March 6	3,298,800	2,930,000	289,611,000	80,102,000	99,115,000
March 13	3,372,850	2,985,000	290,613,000	81,236,000	98,964,000
March 20	3,448,150	3,095,000	291,555,000	81,623,000	97,287,000
March 27	3,431,300	3,060,000	293,587,000	*83,538,000	96,591,000
April 3	3,422,350	3,005,000	297,374,000	83,157,000	95,805,000
April 10	3,426,300	3,005,000	297,468,000	82,579,000	94,581,000
April 17	3,463,550	3,055,000	298,932,000	82,703,000	94,472,000
April 24	3,496,400	3,125,000	300,737,000	82,303,000	94,100,000
May 1	3,497,450	3,140,000	303,249,000	81,407,000	94,291,000
May 8	3,489,200	3,065,000	304,148,000	81,469,000	94,874,000
May 15	3,551,950	3,135,000	305,365,000	80,378,000	95,316,000
May 22	3,550,450	*3,290,000	304,971,000	79,827,000	95,111,000
May 29	*3,573,000	3,245,000	305,745,000	78,758,000	96,139,000
June 5, 1937	3,538,150	3,195,000	.....	77,494,000	97,402,000
June 6, 1936	2,935,450	2,950,000	314,353,000	70,639,000	102,904,000

*All-time peak.

Summary of Wells Completed in the United States Week Ending June 12, 1937

	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total, 1937	Total this Date, 1936
Alabama	.....	.....	.....	.....	.....	1	2
Arkansas	.....	.....	.....	.....	.....	37	40
California	32	25	.....	6	13,562	591	480
Colorado	.....	.....	.....	.....	.....	6	5
Florida	.....	.....	.....	.....	.....	.....	.....
Illinois	4	4	.....	.....	540	42	4
Indiana	11	4	3	4	135	56	99
Kansas	.....	.....	.....	.....	.....	1,029	685
Kentucky	14	9	1	4	154	103	117
Louisiana	20	15	1	4	5,520	358	476
Michigan	14	12	1	1	7,255	376	338
Mississippi	.....	.....	.....	.....	.....	6	2
Montana	7	7	.....	.....	428	64	54
Nebraska	.....	.....	.....	.....	.....	.....	.....
New Mexico	17	16	.....	1	20,921	317	242
New York	.....	.....	.....	.....	.....	5	.....
Ohio	8	5	1	2	60	629	839
Oklahoma	.....	.....	.....	.....	.....	1,341	1,230
Pennsylvania	3	1	1	1	8	76	.....
Texas	322	239	7	76	365,315	6,605	5,536
Utah	.....	.....	.....	.....	.....	.....	.....
West Virginia	25	6	18	1	20	396	316
Wyoming	3	2	.....	1	2,472	52	22
Total this week	480	346	33	101	416,390	12,090	10,488
Total last week	672	463	60	149	382,899	.....	.....
Total this year	12,090	8,311	1,002	2,777	10,193,849	.....	.....

Comparison of Permits Granted for New Wells

STATE	Week Ending June 12	Total this Mo.	Total this Year	Total this Date Last Year	1936 Year Total
Arkansas	6	8	80	50	103
California	30	64	697	427	1,054
Louisiana	12	22	522	551	1,107
Kansas	.....	66	1,155	797	1,873
Michigan	38	62	447	311	762
Oklahoma	.....	83	1,328	1,362	2,594
Texas	311	630	8,193	6,513	15,582
Total	497	935	12,522	10,011	23,075

Down Some More

CRUDE OUTPUT IS NEARER BUREAU RECOMMENDATION

FURTHER reflecting the stricter regulation of the country's oil wells this month, United States crude oil production declined for the second consecutive week in the period ended June 12.

The new production rate was 3,438,650 barrels daily. That was 92,525 barrels a day less than in the previous week.

The sharp decrease brought the nation's production within 72,650 barrels of the daily average market demand as estimated by the Bureau of Mines for this month.

That was the closest conformity with the indicated demand that has been achieved for many months.

This effective balancing of production with demand reflects the comparatively strict allowables that are in effect in June in the leading producing states.

Largely responsible for the sharp decline in output last week was the substantial decrease in Texas production, under the June allowables. The Texas output averaged 1,333,300 barrels a day, or 68,300 barrels a day less than in the previous week, and was 20,700 barrels a day under the Bureau of Mines recommendation.

Oklahoma production was down 1525 barrels at 640,825 barrels daily, but remained above the Bureau of Mines demand estimate by 15,525 barrels.

Kansas last week averaged 190,625 barrels daily, or 9300 barrels a day less than in the previous week, and 75 barrels less than the federal allocation.

California output was down 2500 barrels in averaging 658,000 barrels daily, which was 72,100 barrels a day more than the demand estimate.

Louisiana last week averaged 245,825 barrels daily, or 2450 barrels a day less than in the previous week and 6175 barrels a day less than the Bureau of Mines recommendation.

New Mexico showed an increase of 200 barrels in averaging 114,300 barrels daily. That was 12,300 barrels a day more than the federal estimate of market requirements.

1935, and raised the price by 90 cents in less than two years.

The Pennsylvania grade crude previously had been increased 10 cents a barrel as recently as February 24, this year.

The present figure is higher than at any time since February 17, 1930, when a 25-cent reduction brought the price in the Bradford and Allegany fields from $3 to $2.75.

Tank Car Prices Same

Tank car prices of gasoline in the Mid-Continent late last week were mostly the same as in the previous two weeks.

U. S. motor gasoline f.o.b. Oklahoma refineries was moving within price ranges about as follows: 5⅛ to 5¼ cents a gallon for the 62 octane and below; 5½ to 5⅝ cents for the 63 to 67 octane; and 6⅛ to 6¼ cents for the 68 to 70 octane.

In East Texas the usual 60-62, 400 end point gasoline continued at 5¼ to 5⅜ cents a gallon, f.o.b. refineries.

Kerosene prices also remained unchanged last week from the previous week's levels. At Oklahoma refineries the 41-43 water white kerosene ranged from 4¼ to 4⅜ cents a gallon, and the 42-44 water white grade from 4⅜ to 4½ cents.

United States Crude Oil Production

Estimates Compiled by The OIL WEEKLY

DISTRICT OR STATE	Bureau of Mines Recommendation (Daily in June)	ACTUAL PRODUCTION: BARRELS DAILY FOR WEEK ENDING June 12	June 5
TEXAS—			
Texas Panhandle	.....	72,800	82,800
North Texas	.....	68,400	72,100
West Central Texas	.....	31,500	32,400
West Texas	.....	189,500	203,500
East Central Texas	.....	109,800	118,800
East Texas Field	.....	463,800	463,100
South Texas	.....	214,300	229,400
Texas Gulf Coast	.....	183,200	199,500
Total Texas	1,354,000	1,333,300	1,401,600
OKLAHOMA—			
Oklahoma City	.....	168,575	152,200
Seminole Area	.....	112,175	130,700
Crescent	.....	9,500	12,200
Lucien	.....	15,600	15,400
Fitts	.....	84,225	93,425
Edmund	.....	20,750	21,550
Moore	.....	14,250	13,500
Others	.....	215,750	203,375
Total Oklahoma	625,300	640,825	642,350
KANSAS—			
Ritz-Canton	.....	5,675	5,250
Chase	.....	7,925	8,950
Hollow-Nikkel	.....	2,975	2,573
Sedgwick	.....	4,350	4,275
Burrton	.....	14,375	14,450
Lorraine	.....	4,100	4,600
Russell County	.....	27,350	31,325
Silica	.....	22,225	20,425
Others	.....	101,650	108,075
Total Kansas	190,700	190,625	199,925
LOUISIANA—			
North Louisiana	.....	78,125	80,075
South Louisiana	.....	167,700	168,200
Total Louisiana	252,000	245,825	248,275
ARKANSAS	28,300	29,075	28,025
CALIFORNIA—			
Long Beach	.....	60,000	60,000
Santa Fe Springs	.....	45,000	45,000
Huntington Beach	.....	38,500	35,500
Dominguez	.....	24,800	25,000
Inglewood	.....	16,200	14,000
Ventura Avenue	.....	35,000	34,000
Seal Beach	.....	9,000	9,500
Midway-Sunset	.....	77,000	77,500
Elwood	.....	9,300	9,200
Kettleman Hills	.....	78,700	82,300
Mountain View	.....	18,500	19,000
Playa del Rey	.....	9,000	9,000
Wilmington	.....	41,000	50,000
Others	.....	196,000	190,500
Total California	585,900	658,000	660,500
MOUNTAIN STATES—			
Wyoming	51,000	51,400	52,200
Montana	15,400	15,300	16,100
Colorado	4,800	3,500	3,600
Total Rocky Mountain States	71,200	70,200	71,900
NEW MEXICO	102,000	114,300	114,100
EASTERN STATES	118,200	122,200	119,800
MICHIGAN	38,400	44,300	44,700
Total United States	3,366,000	3,438,650	3,531,175

IN THE

Financial Field

Oil industry holds its favorable position as general outlook less rosy.

* * *

Depletion clause threat so far has not affected oil share trading.

OIL company securities have continued a relatively strong feature of a generally hesitant market.

Recent statistics and information have confirmed earlier predictions of a temporary let-down in industrial and commercial activity. Steel mill operations recently fell back sharply, with labor difficulties closing down some plants. Automobile production and sales have declined materially. In some other lines, also, activity has decreased.

These developments have stimulated the anxiety that has been felt generally, and the financial markets have continued unsteady, at least in part for this reason.

Official Warnings

From Washington there have come, moreover, official statements tending to hold down undue optimism. For instance Secretary of Commerce Roper warned that excessive buying for armament purposes might lead to artificial trade activity, and eventually a depression. He added, however, that business activity likely will be fairly well sustained this summer, unless labor or other difficulties interfere.

Another circumstance pointed out by Secretary Roper was that at this time last year bonus payments caused buoyance of business, and that this factor consequently should be considered when comparing this year's results with those of last year.

Oil Conditions Good

Despite the general weakness of the market, securities of companies in the oil group are comparatively strong. Consequently, the oil shares show a tendency to move upward during any rallies, and they resist any general downward movement.

The relative strength of the oil company stocks is based, apparently, on the particularly favorable general situation in the oil industry, as well as on the fact that the industry now is entering the season of heavy consumption of gasoline and other oils.

The industry so far this year has demonstrated exceptionally good earning power; and the favorable earnings are expected to be extended to the end of the year, despite the fact that costs of materials and labor have increased.

Hope for Crude Raise

Another circumstance that has given encouragement has been the hope of higher crude oil prices generally, following the local increase for East Texas and last week's advance in Pennsylvania grade crude. But optimism is justified even without such an increase. The crude oil prices already are about 10 percent higher than last year, and product prices are proportionally better. These gains in prices, coupled with increased volumes of business, are causing the improved earnings mentioned above.

The consumption of petroleum has been running around 10 percent higher than last year. This increase in demand has applied to nearly all of the products, including gasoline, for which the demand is up about 10 percent.

Prices May Improve

In its current survey of oil production and refining, Standard Statistic Company takes an optimistic view toward the outlook of the oil industry.

"Although increases in crude oil production and inventories have reduced the possibilities of an earlier general rise in crude oil prices," the survey stated, "there is still a good chance of an advance later in the year, provided a sound statistical position is maintained by the industry. Even should there be no additional price improvement, present operating conditions point to one of the best years in the industry's history."

The Standard Statistics Company survey, in regard to stocks, stated: "It is believed in some quarters that a crude oil inventory of 300,000,000 barrels is fully adequate for the present working requirements and that any excess tends to operate against further strengthening of the crude oil price structure."

The report pointed out that June allowables are closely in line with market requirements, and that important additions to crude oil storage should be avoided this month, provided consumption fulfills expectations. If such a balanced position should be continued, it was stated, there would be a good possibility of another increase in crude oil prices later this year.

"With volume of consumption expanding," it was asserted, "another advance in the general crude oil price structure would definitely aid the profits of the crude oil division."

The recent East Texas crude advance of 8 cents a barrel was described as essentially a price adjustment in favor of the high gasoline content crude of that area. But the increase was interpreted as signifying that crude oil prices are tending to increase.

Refining and Marketing

The refining devision of the industry was described in the Standard Statistics Company report as maintaining favorable profit margins, despite higher crude oil prices. The increases in crude prices earlier this year have been compensated, at least in part, by an improvement in prices of products.

"The combination of greater volume, higher prices, and increased operating efficiency is expected to result," it was stated, "in a larger contribution to profits from the refining division than at any time since before the depression."

Conditions in the marketing division of the industry, similarly, were pointed out as being comparatively favorable, with price cutting less extensive than usual at this time of the year.

Profits Are Larger

It was brought out in the report that earnings of oil companies ran more than 50 percent higher in the first 3 months of 1937 than in the corresponding period last year. But subsequent quarters of 1937 are not expected to show such a sharp increase, since earnings ran comparatively high in the latter part of 1936.

For the whole year 1937 it is tentatively estimated, in the report, that earnings will be at least one third higher than for 1936. This estimate makes no allowance for further improvement in prices, but only takes into account present conditions and the improvement in prices and demand over last year. The improvement in earnings is expected to be accompanied by larger dividends generally.

Depletion Deductions Defended

So far there has not been any effect on oil company security prices from the agitation in Congress for elimination of the present depletion deductions allowed oil and mining companies in making out their income tax returns.

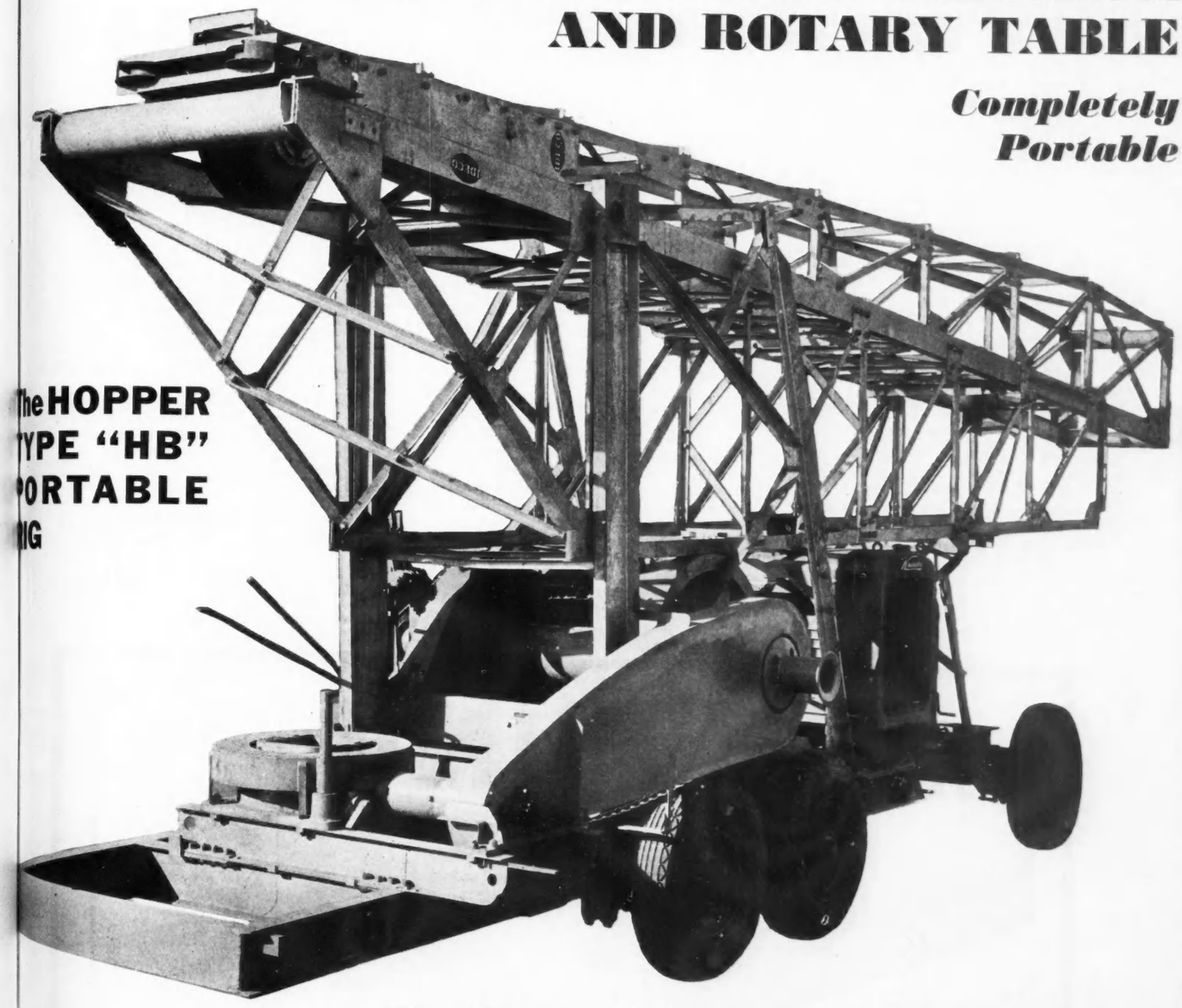
The oil companies are objecting strenuously to a change in the law, and there is hope that the deduction will continue to be permitted. The allowance for depletion is needed, it is contended, to give oil companies encouragement to carry on exploration work. The great cost of finding oil constitutes justification for the depletion allowance, it is asserted. It has been charged, in the move toward eliminating the allowance, that the Treasury has been losing $75,000,000 a year because of the deductions that are allowed to oil and mining companies.

Since 1928 the oil and mining con-

And Now . . .

A *HOPPER* DRAW WORKS UNITIZED WITH COLLAPSIBLE DERRICK AND ROTARY TABLE

Completely Portable



The HOPPER TYPE "HB" PORTABLE RIG

For Rotary Drilling and Exploration Work

is unit has all the features of the Hopper Type "H" Draw rks and can be furnished with either a single or double n. It is designed for use with a prime mover up to h.p. The equipment—including the 3-section, 66-foot lapsible derrick, the 17-inch rotary table, rotary drive, l reel and lighting unit—forms a complete unit within lf and provides for the starting of drilling operations with practically no preparatory work at the location. It is completely portable but has a flexibility and ease of operation which makes it a sturdy, workable drilling unit. The detachable cathead and rotary drive attachment can be quickly removed to reduce the width to less than 8 feet. The weight is within regulation road weight. It is mounted on a special trailer with pneumatic tires to insure rapid transportation.

Your Nearest Hopper Representative Will Furnish You With Complete Details

There is a HOPPER PORTABLE HOIST for every need

California

TROLEUM EQUIPMENT COMPANY
2800 South Alameda Street
Los Angeles, California

Mid-Continent and Gulf Coast

. AMERICAN IRON & MACHINE WORKS COMPANY.
Oklahoma City and Seminole, Oklahoma
Houston and Kilgore, Texas

Foreign

R. J. EICHE
c/o Hopper Machine Works, Inc.
Bakersfield, California

In South America

Geo. S. Flanders, San Fernando, Trinidad

cerns have been entitled to deduct from 5 to 27½ percent of gross income as an allowance for depletion of their mines and wells, and the deduction may be taken although the cost of the properties has been completely recovered.

Earnings Up in 1936

A sharp improvement in earnings of oil companies in 1936 is revealed in a report recently issued by Carl H. Pforzheimer & Company. The report showed that the combined net income of 32 major oil companies for 1936 was 61 percent greater than in 1935. The gain was asserted to be especially noteworthy since it followed a 63 percent increase in 1935 earnings over those of 1934; and since 1934 showed an improvement of 90 percent over 1933.

The 32 companies included in the report showed combined net income of $456,514,394 in 1936, compared with $282,449,650 in 1935.

This sharp improvement in net profit was scored with the combined gross operating revenues up about 12 percent, or to $4,328,484,948 in 1936 from $3,862,422,642 in the previous year.

Last year's improvement in earnings was accompanied by a pronounced betterment of dividends, which were the largest in the recovery period. Cash dividend payments of the 32 companies in 1936 were 92 percent greater than in 1935. These disbursements, as in the case of the earnings, were generally better than for any year since 1929. Cash dividends on the common and preferred stocks of the group in 1936 totaled $252,796,356, compared with $131,808,991 in the preceding year. Although the increase in dividends reflected primarily the industry's improved earnings, it also reflected the new federal taxes on undistributed profits.

Fixed Charges Lower

The Pforzheimer report stated that during 1936 the position of common stockholders of oil companies was further improved by continued retirement of long term debt and additional refinancing of senior obligations, with the result that fixed charges ahead of the stockholders are currently lower than at any time in the past 10 years. The aggregate long term debt of these companies at the close of 1936 amounted to $557,184,430, or about 13 percent of their total capitalization. During 1936 these companies reduced their long term debt about $23,000,000, bringing their total debt retirement for the past six years to approximately $440,000,000.

Barnsdall Refining

Barnsdall Refining Corporation has reported for 1936 a net loss of $718,267, after taxes, interest, depreciation, etc. Although these figures are embodied in its second annual report, the concern did not operate during the full year 1935. In its first annual report the corporation showed for the final 7 months of 1935 a net loss of $484,484. Barnsdall Refining Corporation was formed, effective May 31, 1935, to take over the refining and marketing properties of Barnsdall Corporation. Barnsdall Corporation then became solely a producing company, and began operating under the name of Barnsdall Oil Company.

E. B. Reeser, president, in the annual report of Barnsdall Refining Corporation, stated that the results for 1936, although unsatisfactory, showed a decided improvement over 1935.

He stated that the company does not own any crude oil production, but buys its requirements at the posted prices. It sells refined products at the prevailing market prices. The company's income is limited, consequently, to the margin between the purchasing and selling prices of the oil it handles, less manufacturing and operating costs.

The Barnsdall Refining Corporation has showed decided improvement in both the manufacturing and marketing operations, it was stated. Losses in marketing resulting from excessive rentals on service station leases are being reduced or eliminated, it was said. Similarly, the company discontinued several large jobber contracts that entailed unprofitable business. The business so lost has been more than replaced through profitable jobber contracts, and the advantageous business thus gained is being reflected in 1937 operations.

Empire Oil

Empire Oil & Refining Company for the year ending November 30, 1936, has reported a net loss of $338,811, after depletion, depreciation, interest, amortization, federal taxes, etc.

JUST SAY TRIMO

Throughout the oil fields every day men are getting the safest, most dependable pipe wrenches simply by saying TRIMO—a word that for fifty years has meant a standard quality pipe wrench. Trimo is made throughout of Chrome Molybdenum Nickel Alloy Steel. Handle drop forged. Replaceable parts.

TRIMONT MFG. CO., INC., Roxbury (Boston), Mass.

New TRIMO ALLOY PIPE WRENCH

Look for the Red Tag, always attached to every Trimo Pipe Wrench.

TRIMO PIPE CUTTERS

Made with the care and thoroughness that have marked Trimo production methods for half a century.

TRIMO CHAIN WRENCH

Buy this Trimo Chain Wrench for two reasons: the economy made possible by its replaceable parts, and the safety assured by its quality steel. You'll get service plus from the quality Trimo product.

TRICROME CUTTER WHEELS

Thin Blade Special Analysis Steel treated with silver to prevent rust. Always identified by Red Hub.

OKLAHOMA FIELDS

Coal and Hughes County wildcats show for production.

* * *

Council approves town lot drilling for Sapulpa.

* * *

Possible extension of Wilcox zone at Cromwell.

Tulsa.—This sector of the state was quiet last week, most interest being shown in the wildcat tests drilling in Coal and Hughes Counties, both of which look like fair producers.

Carter Oil Company et al's Thompson 1, CSL NE NW 34-2n-9e, in the Centrahoma area of Coal County, bailed down 400 feet and made on flow of about 87 barrels of oil. The flow went over the derrick. The well had been drilled to 6330 feet and casing was perforated on a level with the Viola lime, then acidized. The flow followed acid treatment. The test was waiting on a new sand line while drilling out a small obstruction which formed in the hole around 5200 feet. Some water was still showing at 4330 feet. Carter and the other companies interested, have started discussion of a well spacing plan for the new area.

The other wildcat, Carter Oil Company's Hamilton 1, CWL NE SW 33-4n-9e, near Citra in Hughes County, drilled plugs to 5935 feet and swabbed 34 barrels of oil in eight hours. It is estimated as a 100-barrel well and was to be swabbed for an oil load, then acidized.

Sapulpa Town Lot Drilling

The various town lot drilling splurges which have taken place in Oklahoma during the past year and a half were being emulated last week by the town of Sapulpa, 15 miles southwest of Tulsa, as city officials and those who formed the idea began working out plans for the orderly drilling of wells there.

Residents of Sapulpa were taking sides on the issue, which will go into effect on or about June 27. Drilling will be limited to Section 36-18n-11e, just southeast of the city. The commissioners have approved the plan which will permit the drilling of only one well to each city block, and which must be at least 125 feet from the nearest building and near the center of the block. Under the ruling, no more than 37 wells can be drilled there.

In Fitts, operators were busy completing another Gilcrease sand producer, the fourth for the field. It is Loual Drilling Company's Cradduck 3-A, SW NE NE 25-2n-6e, making 130 barrels of oil daily from 1885 feet in the Gilcrease sand. The first well in the Gilcrease was Crosby's Hardin 1, SWC NE 30-2n-7e, completed more than three years ago and still making about 30 barrels of oil per day.

Fitts Extension Going Deeper

Operators were reaming to drill ahead at Roodhouse et al's Booth 1, SW NW SE 20-2n-6e, latest extension well at Fitts. Top of the Hunton lime was found at 4039 feet and it was cored from 4045 to 4059 feet, with a recovery of eight feet, the top three feet being dry.

Sinclair Prairie Oil Company's Burris 17, SE NE NW 27-2n-7e, made 51 barrels of oil per hour during a four-hour period, the production coming from the Cromwell sand at 2582 feet. Burris 18, SW NE NW 27-2n-7e, flowed 285 barrels of oil in nine hours from the same formation at 2560 feet.

Deep Rock Oil Corporation's Harden 9, SW SE NE 30-2n-7e, drilled to 3610 feet in the Hunton lime and, following acidization with 10,000 gallons, made 398 barrels of oil on a 24-hour potential test.

Mid-Continent Petroleum Corporation was building rig for Logan 2, SE NE SE 31-11n-5e, east of the Shawnee pool of Pottawatomie County. The new test is an east offset to Logan 1, drilled by Mid-Continent and making about 200 barrels of oil and 65 barrels of water daily on pump.

Amerada Petroleum Corporation and Stanolind Oil & Gas Company's Riddle 2, SE NW NE 2-10n-5e, in the North Earlsboro pool of Seminole County, was completed for a pumping potential of 206 barrels of oil in 6½ hours. It had drilled to 4624 feet. The same Company's Fanny Wood 1, SEc NE 35-10n-7e, in the North Bethel pool, flowed 226 barrels of oil in three hours and was being tested at 3686 feet.

Stanolind Oil & Gas Company and Amerada Petroleum Corporation's Crawford 2, NWC SE 35-15n-2e, north of Welston in Lincoln County, was shut in at 5145 feet while preparing to acidize. During the last 24-hour gauge on the well, it made 336 barrels of oil.

May Revive Stroud

Possible revival of the old Stroud area of eastern Lincoln County was seen last week as Exchange Drilling Company's Dowell 1, SEC NW 10-14n-6e, drilled from 3006 to 3065 feet in the Pure sand and set off a 100-quart shot between 3008 and 3065 feet. The well swabbed 20 barrels of oil daily and was reported making about two barrels a day on the pump.

A small pool may be opened north of Bristow in Creek County as Fowler, Dunnegan et al's Baker 1, NW NE SW 20-17n-9e, was making approximately 2,000,000 cubic feet of gas a day from 2610 feet in the Bartlesville sand. A caving hole made completion of the well a slow task.

Extend Cromwell's Wilcox

The Wilcox zone of Cromwell pool of Seminole County apparently was extended east last week. Merval Oil Company's Johnson 1-A, SE NW NE 10-10n-8e, due east of the field, had the first sand with stains from 4105 to 4110 feet. The second sand was logged from 4135 to 4165 feet. Four-inch casing was set at 4056 feet and the well swabbed 72 barrels of oil in nine hours. Testing was continued. The Texas Company, Carter Oil Company and Skelly Oil Company hold leases near the well.

Sand makes testing of Moore wells difficult

Oklahoma City.—Trouble was being experienced in getting a potential gauge on Anderson-Prichard Oil Company's State 3, SW NE SE 16-10-2w, which pushed the Moore field of Cleveland County one location north two weeks ago. For the third time in less than a week the well looked as though it might get out of control. Top of the Wilcox sand was had at 7226 feet, and after drilling to 7285 feet, seven-inch casing was cemented at 7217 feet. Later that week it was tested through four ¾-inch chokes, flowing 1425 barrels of oil in two hours and 52 minutes with 90,000,000 cubic feet of gas. However, operators have found it almost impossible to make a test because of the large volume of sand it produces. Five master gates having been cut out by the sand flow. Bottom-hole pressure is estimated at 1500 pounds with 250 pounds back pressure. Company engineers are undecided as to what steps should be taken next, but will continue attempts to master the unwieldy producer.

Petitions were filed June 10 asking for arbitrary potentials on three Moore wells that have found trouble making tests through casing. Anderson-Prichard Oil Company's State 3 was one of them. Phillips Petroleum Company's State 1, SW SE SE 16-10-2w, an older well, has filed a similar petition. The other well is Sinclair Prairie Oil Company's Marvel 3, NW NE NE 21-10-2w.

There are seven other wells in the field operating under potential figures set by the commission because operators found it dangerous to open them long enough for tests. The arbitrary figure is 24,108 barrels.

Another well which was having trouble was Sinclair Prairie Oil Company et al's Marvel 3, which drilled to 7266 feet, and which cut connections twice while being tested. Gas was estimated at 50,000,000 cubic feet and tubing was to be run under pressure.

Gulf Oil Corporation's James 3, NE NW SW 27-10n-2w, was originally completed for a potential of 3082 barrels at

7288 feet, but was killed to deepen. Carried to 7291 feet in the Wilcox sand, the well made 246 barrels the first hour, and averaged 162 barrels hourly during the next three hours before being shut in.

Phillips Petroleum Company's Oklahoma 1, SW SE SE 16-10n12w, drilled to 7252 feet in the Wilcox sand and showed for an estimated 100 barrels of oil an hour with 10,000,000 cubic feet of gas.

Billings Extended

Other counties in the district had their share of activity. Continental Oil Company's Conway 2, NEc NW 21-23n-2w, extended the Billings pool of Noble County one quarter-mile to the west last week, swabbing 51 barrels of oil in eight hours from 4314 feet. After deepening to 4319 feet, the well made 371 barrels in four hours. It was decided to drill ahead and when the well had been carried to 4329 feet, it flowed 447 barrels of oil in six hours through casing. Tubing was to be run and potential taken.

Continental's Conway 3, NE SW NW 21-23n-2w, drilled to 4312 feet in the Wilcox sand and bailed down 900 feet. The well then flowed 443 barrels of oil in two hours and made 1,000,000 cubic feet of gas. It later established a potential of 2678 barrels of oil and 1,946,000 cubic feet of gas, flowing through tubing.

Tide Water Associated Oil Company's Shaffer 2, NW NE SW 21-23n-2w, one location west of production at the south end of the pool, drilled to 4339 feet. At that depth the well flowed 1299 barrels of oil the first four hours of a six-hour gauge.

Location has been made for Shaffer 4, NE NW SW 21-23n-2w, one location west of the new producer.

Summitt Drilling Company's Dolezal 1, SEc SW 8-22n-1w, northeast of Polo in Noble County, topped the Wilcox sand at 5135 feet and drilled to 5183 feet. Packer was set at 5117 feet and when opened for 30 minutes the well flowed 50 feet of mud and no oil or gas. Drilling was resumed and the well was going ahead below 5212 feet. Mid-Continent Petroleum Corporation's Dobson 1, SEc 11-17n-1w, in the Langston pool of Logan county, topped Wilcox sand at 5073 feet and drilled to 5084 feet. It was drilled ahead to 5088 feet and flowed 120 barrels of oil in 12 hours, and had from 10 to 12 feet of mud in the hole. On the last 24-hour test the well made 244 barrels of oil.

The Wilcox sand and all sands above it were to be tested at Ohio Oil Company's State 1, SWc 13-23n-3w, southwest of Billings in Garfield County. Seven-inch casing was cemented at 4905 feet and casing was to be perforated.

A. R. DENISON, division geologist for Amerada Petroleum Corporation in Texas, New Mexico, Louisiana and Southern Louisiana, has been transferred from Fort Worth to Tulsa to become head of the company's geological department. Denison has been with the company about 17 years, and has been spending considerable time in Tulsa since the death of Sidney Powers, former chief geologist, in November, 1932. J. F. Hosterman, assistant division geologist with about 15 years of continuous service with the company, has succeeded Denison at Fort Worth.

Interesting developments in South Oklahoma

Ardmore. — Southern Oklahoma stepped into the picture last week by reporting two deep tests; possible revival of an old area in Stephens County and what may be an extension of the old Granite area of Greer and Kiowa counties.

The old Fox field of Carter County is due for another deep test in the near future as Gulf Oil Corporation has purchased half interest in the 320-acre C. R. Smith estate in Section 26-2s-3w. Work is to start not later than July 31 on the test which will be carried to 9000 feet. The new test is east of Carter Oil Company et al's Ruth Williams 1, one of the most closely followed wildcat tests ever to be drilled in that part of the state.

The other deep test to get under way soon is to be drilled by Carter Oil Company and others in Grady County. It will be at NE SW NE 26-5n-8w, in the very heart of the old Chickasha gas field. Leases were purchased from John D. Nichols and the well has a contract depth of 10,000 feet. Joining Carter in the venture are Oklahoma Natural Gas Company, Magnolia Petroleum Company and Stanolind Oil and Gas Company. They are also lease holders in the field.

The Chickasha gas field was opened 17 years ago by Nichols, who drilled a test in Section 26-5n-8w, and which was completed for 48,000,000 cubic feet of gas, coming from 1350 feet in sand, the formation later being given his name. A deeper gas sand was encountered between 2450 and 2500 feet by W. E. Ramsey at a later date, which produced 55,000,000 cubic feet of gas and a fair amount of high gravity crude. The area is on what is known as the Chickasha anticline in the Permian basin, and although several deep tests have been attempted in the immediate area, none have been successfully completed as commercial oil producers.

Stephens Well Flows

Helmerich and Payne's Graham 1, SWC NE 12-1n-5w, in the old Doyle pool of Stephens County, put that area back in the spotlight last week by flowing oil after cleaning out to about 700 feet. The fluid consisted of about one-third oil. Present source of the production is unknown, but the well will be cleaned out to the bottom and a test made. Earlier it showed nothing below 4300 feet.

Reports from the area state it will probably have pipe set at the 4300-foot level and testing will be started there. A renewal of activity is looked for in the sector which is an old shallow area.

May Extend Granite

In Kiowa County, operators are watching what is hoped will be an extension of the old Granite area, which had its origin just to the west of the north fork of the Red River in Greer County. The well is Kiowa Oil Company's Frank Fender 1, C SW NE 4-6n-20w, which had gas showings at 380 feet and oil and gas showings from 620 to 648 feet. It was drilling at 710 feet.

The new test is checking some 40 feet higher than other tests in the area, the nearest being Rosenthal and Debolt's Burnett 1, NW SE NE 30-7n-20w, which was completed several weeks ago for 26 barrels of oil in 24 hours. Even fair production it is thought will bring about revival of interest in the sector. The Granite pool proper was opened in 1901 by some ranchers drilling a water well.

Carter Oil Company et al's Harley Community 1, C NW NE 24-2s-4w, in the Milroy area of Stephens County, drilled to 5968 feet in the Viola lime and was fishing.

Favor composite decline curves for potentials

Wichita.—Representatives of 30 operators active in Kansas, designated as a committee to consider the question of potential tests, met here June 9 to formulate and approve a new method from engineering data obtained through sub-committees making a study of the problem.

Consideration of the problem led to to the approval of a composite decline curve based upon production by a majority of the committee, with a minority group favoring a modification of the present potential gauge. The proposed method approved by the majority may result in considerable decreases in costs of potential tests and may be a forward step in conservation of reserves.

A brief of the findings of the committee with recommendations and possible revisions will be presented within two weeks to the Kansas Corporation Commission by A. S. Ritchie, McPherson Drilling Company, chairman of the general committee.

Capacity of Hobbs-Crane carrier will be boosted.

Midland.—Construction of two pipe line loops, aggregating 40 miles of 12-inch pipe, will be started shortly by the Texas-New Mexico Pipe Line Company between Jal, New Mexico, and Crane, Texas, and booster stations will enlarge the capacity of the existing 10-inch carrier from 32,000 barrels to 60,000 barrels daily. The company has a 12-inch line, extending southeast from Crane station to Houston, and is restoring pumping equipment in the original stations to permit capacity load by August 1.

A new main line station is being erected about two miles north of Monahans, Ward County, and between Crane and Jal stations. It will include three reciprocating pumping units, powered by 400 horsepower Diesel engines, with each unit rated at 25,000 barrels daily.

Authorization has been made for laying 10 miles of 6-inch welded line from Monahans station to Estes field, South Ward County district, where connections will be made with Tide Water Associated Oil Company's Johnson property.

H. K. V. TOMPKINS, vice president in charge of operations in the Southwest for Geo. F. Getty, Inc., Fort Worth, recently attended a conference of officials in New York City.

KANSAS FIELDS

Four new fields added to western part of state.

* * *

Source of oil in Ness County strike undetermined.

* * *

Extensions are recorded in a number of counties.

Wichita.—Four new oil fields were added to the total for Western Kansas last week when strikes were registered in Barton, Ellis, Ness and Rice counties.

Most attention has been centered on the completion of Newton Development Company et al's Tenny 1, NWc SE 19-18s-25w, Ness County, which filled 3400 feet with oil, which came from 1 foot in a formation topped at 4380 feet. On the swab it made 60 barrels and ceased production. It was shut down to allow the hole to refill.

The source of the oil, which is above 40 gravity, is being questioned. First reports were that the hole was bottomed in Mississippi chat. Later the Viola lime was given consideration.

The well is 3½ miles south of Aldrich pool and 1½ miles southeast of Thompson pool. Aldrich production is from the basal conglomerate at around 4430 feet. The siliceous lime is the source of oil in the Thompson pool. Each of these pools was opened by Continental Oil Company.

Lack of pipe line outlet has retarded development in this part of the state. Oil from these pools as well as from the Shallowater pool, Scott County, is hauled to refineries and pipe line stations by truck.

Bridgeport Hits in Ellis County

The Ellis County discovery well is Bridgeport Machine Company et al's Forelich 1, NWc SE 4-13s-16w, midway between the South Fairport and Catherine pools. It made a potential of 1146 barrels from Oswald lime at 3265 feet.

In Rice County Fred Phillips et al's Hubenett 1, SW NW SW 23-26s-62w, filled with oil from the chat topped at 3354 feet and on a 10-hour test swabbed 500 barrels. Initial output is estimated at 1000 barrels. This well is two miles north of Welch pool. There are two dry holes between it and the latter pool.

The Texas Company's Henning 1-A, NEc NW 22-19s-11w, Barton County, made a flow of 15 barrels an hour from Lansing lime, found at 3066 feet. Casing was set at 3100 feet and drilling continued to 3115 feet. The hole may be drilled deeper. Nearest production is in the Lanterman pool, which is one mile north and has but one well.

Shawnee Oil & Gas Company and Jones & Lane were preparing to spud at Page Milling Company 1, SEc NW 36-18s-26w, two miles southwest of Tenny 1.

Several Extensions

Gulf Oil Corporation's Sessler 1, NEc SW 24-20s-11w, which extended production one location southwest in the Peter pool of Barton County, flowed 154 barrels of oil in three hours and 35 minutes from Siliceous lime at 3233 feet. Tubing was being run. Top of the lime was found at 3243 feet and the hole filled 3000 feet with oil while coring. It flowed 10 barrels of oil in 30 minutes after bailing down to 3251 feet.

A possible extension well is M. D. Scruggs et al's Darwin Bolton 1, SEc NW 31-18s-7w, located one mile southeast of production in the Genesee pool of Rice County. It looks to be good for 1500 barrels of oil daily. During a two-hour flow the well made 135 barrels. It is producing from 3216 feet in the Siliceous lime. Four offset tests have been staked.

Bemis Extended

Jones Brothers Drilling Company and Lew H. Wentz's Bemis 1, NEc NW 28-11s-17w, extended production one half mile west in the Bemis pool of Ellis County last week. The well, which is northeast of Hays, filled 2200 feet with oil in one hour after the plug was drilled at 3422 feet in the top of the Siliceous lime. It was drilled ahead to 3425 feet and was standing full of oil when last reported.

Comanche Oil Company's Cramm 1, SWc SE 15-19s-9w, northeast of Chase in Rice County, was a new producer from the Kansas City lime. The hole filled 1500 feet with oil overnight from the lime at 2947 feet. The formation was topped at 2876 feet, and after the swab was run three times the well started flowing, but has since been shut in for tankage. The test is one mile east of production at the north end of the Chase pool.

Ainsworth Outpost Shows

Stanolind Oil & Gas Company's Struder 1, SEc SW 26-16s-13w, 1½ miles northeast of production in the Ainsworth pool of Barton County, was waiting on cement after plugging back from 3412 to 3410 feet in Siliceous lime. Top of the formation was found at 3402 feet and some water was showing around the bottom of the hole. It filled more than 1000 feet with oil in a short time. When drilled to 3510 feet the well swabbed 26 barrels of oil an hour.

Schermerhorn Oil & Gas Company et al's Bird 1, NEc 33-18s-15w, near Albert, drilled to 3536 feet and got a small show of oil but lost it when water entered the hole. It was to be plugged back to 3524 feet and completed for an estimated 12,000,000 cubic feet of gas found there.

Good Bloomer Well

Phillips Petroleum Company's Patzner 1, SW NW SW 30-17s-10w, in the Ellsworth County sector of the Bloomer pool, was completed for 1624 barrels of oil from Siliceous lime at 3300 feet. On a 12-hour pumping test the well made 812 barrels of oil.

Tabor & Coleman's Mueller 1, NEc SE 25-24s-5w, east of production in the Yoder pool of Reno County, topped the chat at 3360 feet and encountered both oil and water. The well was drilling ahead below 3415 feet with about 800 feet of fluid in the hole. In the same area, Drillers Gas Company's Yoder 1, SW NW SW 27-24s-5w, had 1000 feet of oil in the hole and about 5,000,000 cubic feet of gas. Production was coming from 3438 feet in the chat.

Barnsdall Oil Company's Hathaway 2, NWc NE 33-19s-10w, in the Silica pool of Rice County, was completed for 2052 barrels of oil from the Siliceous lime at 3283 feet. Hathaway 1, which recently extended production one quarter mile east in the pool, was completed for better than 2100 barrels of oil. The company has started two other tests on the lease. Hathaway 3, SE NW NE 33-19s-10w, was rigging up rotary, and the other test was reaming at 190 feet.

Wildcat Running Low

Four miles north of Silica, Stanolind Oil & Gas Company's Mooney 1, NEc SW 5-19s-10w, topped Siliceous lime at 3408 feet and was coring ahead below 3415 feet with neither water nor gas showing. The well was reported running rather low.

W. M. McKnab et al's Files 1, SEc NE 20-32s-5e, an east offset to the discovery producer in Frog Hollow pool of Cowley County, was flowing by heads, tanking 253 barrels of oil in 24 hours. Production was from the Bartlesville sand at 3069 feet. Derby Oil Company's Goering 8, SEc NE 17-21s-1w, at the north end of Graber pool, McPherson County, failed to react to acid treatment and was swabbing, making about 2 barrels of oil an hour from 3337 feet. Continental Oil Company's Huxman 2, NEc NW 29-21s-1w, was a new producer on the east side of the pool when it filled 800 feet with oil from the Hunton lime at 3305 feet. It was to be drilled deeper.

Schoenfeld & Kitch's Suppes 1, SWc 14-16s-16w, just east of the old Winget area of Rush County, made 297 barrels of oil in 24 hours from Gorham conglomerate between 3543 and 3555 feet.

NORTH AND WEST TEXAS

Gaines County takes lead in Permian wildcatting.

* * *

Panhandle gas reserves in demand at high prices.

Midland, Texas.—Expiring lease contracts have enabled Gaines County to advance to first position among the active wildcat centers in the north portion of the Permian basin. Operations have been started on 10 projects, including 5 for the Wasson geophysical prospect, which has been conceded for several weeks as being the next oil strike for the district. Amon G. Carter and Continental Oil Company's A. L. Wasson 1, SW SW NW Section 48, Block AX, PSL Survey, was preparing to cement pipe for a production test at 4959 feet after logging an oil stain in lime at 4800-4900 feet ,and saturation at 4930-50 feet, with an elevation of 3549 feet. High pressure gas production found in the upper section of the big lime, topped at 3830 feet, or 281 feet sub-sea, proved the high structural position. Four additional tests on separate short term leases have been started on the strength of the performance of Wasson 1, and are located along a northeast to southwest trend for a distance of 4½ miles.

Wasson Structure Unusual

The Wasson structure lies in a northeast-southwest trend, according to the geophysical picture, offering an unusual condition for the district, as other known structures generally follow a northwest-southeast trend. By coincidence lease requirements resulted in the follow-up tests being spotted along the trend of the structure.

Carter and Continental Oil Company's G. M. Langdon-Moore 1, SE SE NW Section 44, Block AX, about 3 miles northeast of the original test, was drilling at 2200 feet. Continental Oil Company's W. M. Moore 1, SWc Section 46, an intermediate location, was drilling at 225 feet. Carter et al's Wasson-Moore 1-B, a south offset to the latter, shut down after spudding with machine to install rotary and may not resume until a production test is given the original well for the block.

Amerada Petroleum Corporation invaded the Wasson area last week with an active test on the Florence Matthews 320-acre lease, NEc Section 417, Block G, slightly more than 1¼ miles southwest of the prospective oil producer, owing to its lease contract expiring June 11, unless a test is started in the meantime. Amon G. Carter et al recently paid $500 cash for a one-year top lease on the above one-half section, but will not obtain delivery of lease on the tract. York & Harper, Inc. are contracted to drill a test as part consideration for lease on E½ Section 345, Block G, about 1¾ miles southeast of Wasson 1.

Seminole Area Active

Resumption of production tests on Shell Petroleum Corporation's Mann 1, east offset to the discovery oil producer of the Seminole structure, Gaines County, were underway late last week after cementing blank liner 33 feet off bottom to exclude dry gas production and cavey hole below 7-inch casing seat at 4912 feet. This test was drilled to 5060 feet, or 1712 feet sub-sea, and flowed four barrels oil per hour and gas at rate of 4,000,000 feet daily on 1-inch tubing choke natural before production was mudded off to run liner.

Amerada Petroleum Corporation's Fasken 1, C NW NW W. T. Ry. Section 160, Block G, about 4-1/3 miles southeast of Seminole production was drilling near 4400 feet, having logged base of salt at 3088 feet, and top of Yates sand with gas showings at 3237 feet. It has an elevation of 3283 feet, and is about 212 feet lower on structure than the Seminole discovery, using the Yates for correlation.

Continental Oil Company's Dr. E. H. Jones 1, C SE NE Section 22, Block A-27, southwestern Gaines County wildcat, logged show of gas in Yates at 3132-45 feet, with an elevation of 3650 feet, and was drilling at 3500 feet. L. H. Wentz et al's Dalmont-Conoco 1, C NE SE Section 5, Block A-22, south part county, is relatively low on structure for the area in drilling at 4700 feet, with an eelvation of 3302 feet. In northwestern Gaines County, W. M. Blevins, Sloan and Shell Petroleum Corporation's Barber 1, NW NE NE Section 19, Block A-28, logged top of salt at 1660 feet, with an elevation of 3473 feet, and was drilling at 2750 feet. Argo Oil Corporation's E.H. Jones 1, C NE Section 2, Block A-7, Gaines County, was drilling at 1600 feet.

Failure in Cochran

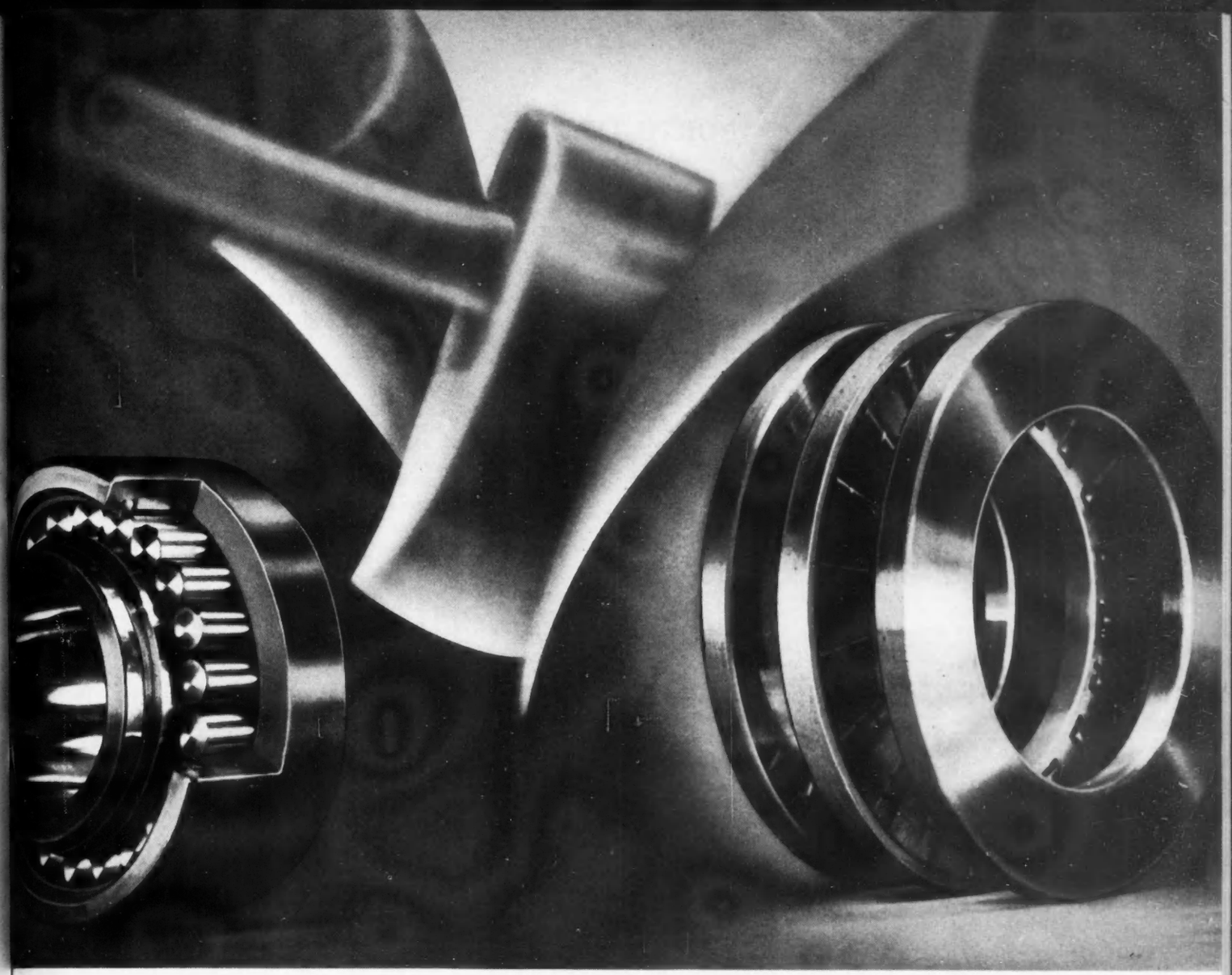
Cochran County's active wildcat was listed as a failure, but three prospects are to be drilled on the Slaughter ranch. R. S. Bond, L. C. Harrison and E. E. Fogelson's Wm. Cameron 1, Labor 1, League 85, Greer County School Lands, was abandoned at 4950 feet in sulphur water horizon topped at 4800 feet, or 1100 feet sub-sea. Pete N. Wiggins, Jr., H. H. Lawson and Ed. Hyde are moving in rig to drill Slaughter-Dean 1, Labor 26, League 92, Lipscomb County School Lands, on their original 8000-acre block purchased last March for $10 per acre cash. These independents have since taken up option held on a second block at the same price, and have made location in NEc League 58, Martin County School Lands, about five miles northeast of the first location. Operations will begin on the latter within 60 days. Both tests will drill to 5200 feet, unless productive at a lesser depth, and are adequately financed through the sale of protection acreage. The Texas Company is obligated to drill on its 7000-acre block acquired last March in Leagues 130 and 131, Carson County School Lands.

Difficulty in renting a standard rig unit has delayed operations on Ernest L. Wilson, Illinois Oil Company et al's Yellowhouse Land Company 1, Labor 4, League 700, State Capitol Lands, southeastern Bailey County prospect, which has cemented 7-inch at 4497 feet. This northernmost test for the Permian basin district logged first solid lime at 4300 feet, with an elevation of 3687 feet, and oil stained lime with good porosity appeared in cores at 4400-50 feet. Owners elected to switch to cable tools in penetrating the lower lime horizon. George Mayer, Amarillo, et al are credited with having optioned a large block, centering upon League 196, Lubbock C.S.L. Survey, and Leagues 194 and 195, Foard C.S.L. Survey, and propose to offer lease spreads for the financing of a Permian test.

New oil field found in Moore County

Pampa, Texas.—A new oil pool for northeastern Moore County and adjacent to the Hutchinson County line has been uncovered by Phillips Petroleum Company's Ray Ebling-McDowell 1, center of A.B. & M. Section 18, Block M-16, from lime horizon while engaged in developing natural gas reserves. Dry gas production, rated at 14,000,000 feet daily, was producing from regular lime zone at 2875-3100 feet, and oil saturation was topped at 3210 feet when work was halted by flood waters. The well was opened June 2, and flowed 190 barrels oil in 12 hours, including accumulation during the two weeks it was waterbound. Location is on the east flank of the lime high that cuts across the above two counties. Occasional appearance of an oil producer on the fringe of the gas belt is not unusual.

Competition for proved and prospective gas reserves in the Texas Panhandle, and partially developed oil properties has not subsided, although values have soared to record levels. Phillips Petroleum Company has contracted for the purchase of L. S. Hobbs Oil Company's J. P. Pearson-Hitch 1, discovery gasser for northern Hansford County, and surrounding block of 15,000 acres. This wildcat gasser was completed last March rated at 5,400,000 feet of gas, testing 415 pounds rock pressure, after nitro shot at 2675-2840 feet. It was drilled to 2864 feet, or 136 feet above sea level. Since the successful completion of this wildcat an active lease campaign has been staged in western Hansford County and eastern Sherman County by majors in anticipation of the eventual linking of the Panhandle gas belt with that of the Okla-



Splitting THE LOAD

When a manufacturer of rubber machinery had to obtain maximum combined carrying capacity in a given space while dealing with enormous but incalculable combinations of radial and thrust loads — he came to ROLLWAY.

We found that maximum capacity called for loads perpendicular to roller surfaces. As a result the ROLLWAY design split the load into pure radial and thrust components. This handles the load with the greatest efficiency and makes the best possible use of a fixed and limited outside diameter. The ROLLWAY performance has been so much superior that it is now *standard* equipment.

A ROLLWAY Analysis of your bearing problems aims at maximum performance, which only concentrated experience and study in a single field can give.

ROLLWAY BEARING CO., INC., SYRACUSE, N. Y. Factory Representatives in — Boston, Chicago, Cleveland, Detroit, Philadelphia, Pittsburgh, and Youngstown. Agents: C. W. McNeil, 1813 Second National Bank Bldg., Houston, Texas; D. A. Cant, P. O. Box 402, Tulsa, Okla.; H. G. Mouat, Martin Bldg., Birmingham, Ala.; Precision Bearings, Inc., Los Angeles, San Francisco, Portland and Seattle.

CYLINDRICAL ROLLER

ROLLWAY BEARINGS

homa Panhandle and southwestern Kansas.

Cash bonus of about $250,000 has been paid by Phillips Petroleum Company for gas rights under The Texas Company's 15,700 acres of scattered leases in Moore County, centering in sour gas area in H&TC Ry. Survey, Block 44, and T&NO Ry. Survey, Block 3-T. Price per acre averages about $16.

Hutchinson County's lime areas are the most popular with companies and individuals acquiring oil properties in the district. Territory within and adjacent to Stinnett is due to an aggressive drilling program because of development terms set out in several trades. Seaboard Oil Corporation, Dallas, a new entrant, is drilling its first two tests on the J. A. Whittenburg lease, embracing the north 120 acres of Section 17, Block 47. This lease and all of Section 16, aggregating 479 acres, requires 4 wells the first year, and 6 wells per year thereafter until a well is on each 20-acre unit. Three-well drilling obligation in addition to a cash bonus of $20,000, and an oil payment of $80,000 out of ⅛ of the production is reported to have been paid by H. G. Marshall et al for lease on the W½ SW T. C. Ry. Section 22, Block M-23, Stinnett townsite. Stansylvania Oil & Gas Company is credited with having contracted to pay $500 per acre from ¼ production for lease on 240 acres of the Belle Wisdom land in W½ of T. C. Ry Section 35, Block M-23, and has started work on the first test. Drilling & Exploration, Inc. recently purchased E. W. Means et al's R. L. Pond 1, and lease on the east 79½ acres of N½ T. C. Ry. Section 2, Block M-21, for $40,000 cash and an equal sum due from ¼ of the production, and two additional wells the first year.

Want permits for pick-up stations

Austin.—Granting permits for the operation of "legitimate" pickup stations may be a subject for the statewide proration hearing June 18.

Attorneys for one of the large East Texas reclamation plants had asked for a special hearing and was advised to present this matter to the statewide hearing.

TEXAS PANHANDLE
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CARSON COUNTY—		
Panhandle Eastern P. L. Co., S. B. Burnett 1, sec 119	¶31	2633
GRAY COUNTY—		
F. W. Dye et al, A. Holmes 3	329	3268
J. Alvin Gardner et al, E. G. Barrett 6	765	3315
Gulf, E. G. Barrett 8	600	3289
Shell, T. B. Haggard 3	333	3300
Sinclair Prairie, A. G. Post 2	400	3285
Harry Stekoll et al, J. A. Whittenburg 9-B	469	3046
MOORE COUNTY—		
Panhandle Eastern P. L. Co., J. T. Sneed 1, sec 43	¶21.3	3150
WHEELER COUNTY—		
King Oil Co., E. L. Lassiter-L. H. McElroy 1	15	2255
Smith Bros. Ref. Co., Johnson 8	300	2553

*Failures; †Junked; ¶Million cu. ft. gas.

NORTH TEXAS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ARCHER COUNTY—		
Alexander & Killeon, R. O. Andrews 4	*	958
L. T. Burns et al, Claude Cowan 1-A, blk 6	6	1108
N. G. Goldsmith et al, Ann Koester 1, sec 1810	*	1092
S. H. Huggins et al, W. Ford 4-B	76	1000
H. M. Tebay et al, J. T. Richardson 1, blk 12	*	1242
Texas Co., J. H. Turbeville 1-J, sec 172	*	1610
CLAY COUNTY—		
Walter H. Gant et al, C. M. Worsham 3, sec 37	1500	3927
COOKE COUNTY—		
Denver Prod. & Ref. Co., W. F. Solomon 1	*	3542
Dove Oil Co., J. A. Carr 12	58	1952
I. Johnson 2	*	2551
H. H. Gerdes et al, F. J. Truebenback 2	*	1824
Hudspeth-Harvey & Bassett, Truebenback 8	15	1445
Kerlyn Oil Co., Bob Black 1	*	2080
Kingery Bros. et al, J. Havercamp 1	*	810
A. D. Robinson et al, J. H. Otto 7-A, blk 5	10	835
Schermerhorn Oil Corp., M. Kessler 6, blk 5	35	1290
Seitz-Comegys & Seitz, Inc., Trew 21-A	*	1655
JACK COUNTY—		
Carpenter Oil Corp., W. D. Moore 1, blk 7	*	751
Cato Oil Co., J. A. Raley 5-B	219	3045
Barney Cockburn & Harper, R. R. Clayton 1	405	3055
R. D. Compton Oil Co., C. C. Henderson 2-A	*	165
W. J. Grisham et al, S. Castleberry 1	*	3223
Hill & Hill, Clayton Bros. 1-B	245	2993
Kimberlin & Howse, H. L. King 1	100	2991
L. O. Moore 1	100	2992
Tabernacle-McKee 1	100	3025
Moncrief & Showers, Inc., S. M. Jones 3	273	3112
Panhandle Ref. Co., M. K. Graham 1	*	3360
O. J. Perren et al, Clayton Bros. 1	88	3043
Texas Plains Oil Co., W. H. Terrell 6-B, blk 11	*	747
Jas. O. Wilson et al, J. A. Beezley 1	208	2960
MONTAGUE COUNTY—		
Arco Oil Co., Salmon 8-E	84	1635
Bridwell Oil Co., F. H. Begley 3-C	25	1785
Continental, A. B. Hinton 7	*	1834
Gulf, W. W. Jones 8-B	37	840
Lesh & McCall, Cunningham 17-A	5	970
Perkins & Cullum, Mrs. M. Salmon 4	42	930
Sinclair Prairie et al, D. T. Holt 10, blk 45	150	1730
WICHITA COUNTY—		
Bridwell Oil Co., J. S. Bridwell-Boise 1	*	1989
Cable Oil Co., J. E. Roller 25	*	276
G. W. Cooper et al, W. T. Waggoner Est. 21-C	*	1921
W. T. Waggoner Est. 22-C	*	1656
Douglas Prod. Co., L. P. Douglas 31-A, sec 14	5	686
King Oil Co., M. M. Stone 7-A	15	1626
W. T. Waggoner Est. 4-R	*	1925
Tom B. Medders et al, W. T. Waggoner Est. 1, sec 13	*	1982
Perkins-Cullum Oil Co., S. B. Burnett 27, sec 5	20	1375
S. B. Burnett 28, sec 5	18	1541
Pois & Schulz, Foster-Allen 1-F, sec 2	†	1315
WILBARGER COUNTY—		
Gibson & Jennings, Inc., W. T. Waggoner Est. 2, sec 109	35	1293
Hamilton Pet. Co., R. L. Castleberry 1, sec 100	†	1587
Phillips Pet. Co., W. T. Waggoner Est. 6-00, sec 47	*	2618
Luther Webb et al, W. T. Waggoner Est. 1-J, sec 49	*	2687
YOUNG COUNTY—		
L. T. Burns et al, W. A. Rushing 9, sec 3401	18	904
Butler et al, J. W. Davis 1	*	804
V. E. Eckolm et al, Belknap Coal 1, sec 356	*	725
J. B. Marrs 1, sec 356	*	725
Pet. Producers Co., C. E. Luton 11	10	671
Pitzer-West & Lion Oil Ref. Co., Faye Aray 1, sec 3411	*	4533
Rathke Oil Co., C. E. Graham 17, sec 3401	*	964
E. M. Remington et al, Fee 1	*	500
W. R. Stafford et al, W. E. Foster 1, sec 337	*	1043
Texas Co., A. D. Moore 1, sec 3412	*	4929

*Failures; †Junked; ¶Million cu. ft. gas.

WEST TEXAS
Completions

Company, Well and Location	Init. Prod. Bbls	Depth
ANDREWS COUNTY (Means)—		
Humble, J. S. Means 21	310	4532
CRANE COUNTY (McKamey)—		
Bert Fields et al, A. Gibbs-Conoco 6	780	2299
CRANE COUNTY (McCamey)—		
Gulf-Cranfill Bros., J. B. Tubb 6	1257	4420
CRANE COUNTY (Waddell)—		
Gulf, M. F. Henderson 8	4328	3547
COCHRAN COUNTY—		
R. S. Bond-L. C. Harrison-E. E. Fogelson, Wm. Cameron 1	*	4940
ECTOR COUNTY (Foster)—		
Atlantic, H. C. Foster 2	450	4190
Barnsdall, J. L. Johnson 1	452	4252
Stanolind, J. L. Johnson 1	397	4197
York & Harper, Inc., H. C. Foster 3	635	4199
York & Harper & Sloan-Zook Co., J. E. Bagley 1	†	1210
ECTOR COUNTY (Goldsmith)—		
Atlantic, W. F. Cowden 5	485	4260
TP Land Trust 2-B	364	4280
Gulf, C. A. Goldsmith 18	2321	4245
C. A. Goldsmith 23	1572	4230
Humble, W. F. Cowden 5	2456	4280
Landreth Oil Corp., H. E. Cummins 1-A	497	4238
Manson Oil Co., H. E. Cummins 3	298	4253
ECTOR COUNTY (Judkins)—		
The Texas Co., W. E. Connell 15	259	3673
ECTOR COUNTY (North Cowden)—		
Stanolind, J. M. Cowden 48	1098	4290
J. M. Cowden 49	1742	4319
GLASSCOCK COUNTY—		
Continental, Overton 3-A	826	2478
Conoco-Group 1 Oil Corp., Settles 33-S	469	1280
John I. Moore, Lofland Bros. et al, McDowell 3, Lse 2	1554	2402
HOWARD COUNTY—		
Sun Oil Co., H. Phillips 8	122	2512
JONES COUNTY—		
W. H. Peckham, Yates & West, Denton Nat'l Bank 1-A	*	1995
Pet. Producers Co., H. C. Harvey 2	*	1670
Sinclair Prairie, B. King 3-A	99	2229
UPTON COUNTY (McCamey)—		
Anderson Oil Co., Dave Elder 1	65	2232
Cardinal Oil Co., Cordova Union 3-A	516	2284
Cordova Union 2-B	*	2190
T. B. Knox et al, A. S. Burleson 2	*	2350
WARD COUNTY—		
Atlantic, W. D. Johnson 27	600	2540
Harry Black & Hedrick, White 3	202	2215
FHE Oil Co., Green 5	591	2450
L. Richter 7-C	2442	2958
J. J. Gibson-Little Kanawha Prod. Co., J. L. Carothers 1	253	2290
Humble, L. Richter 15	1158	2620
Magnolia, Edna Brillheart 2	49	2498
Standard Oil Co. (Tex.), Hardage-Wilson 5	21	2525
I. B. McFarland 9, sec 37	2446	2629
I. B. McFarland 10, sec 37	1213	2650
Joe A. Worsham et al, Reynolds 2	73	2216
WINKLER COUNTY (Emperor)—		
J. M. Weaver-Hoffman & Page Co., T. Morton 3	175	2900
WINKLER COUNTY (Gulf-O'Brien)—		
Harry Adams, Hitchcock & Bradley, J. Sealy-Conoco 4	1315	3126
WINKLER COUNTY (Halley)—		
Eastland Oil Co., S. M. Halley-Amerada 4-A	892	2825
WINKLER COUNTY (Kermit)—		
Bert Fields et al, O. Clapp-Pure 10	1551	3115
Illinois Oil Co., Abilene State Bank-Conoco 16-B	1221	3112
Magnolia, J. B. Walton 81	487	2954
J. B. Walton 82	606	2925
J. B. Walton 83	327	2900
J. C. Maxwell, Inc., Gartex O&G Co. 3-B	1295	3138
Navarro Oil Co., F. S. Vaden 4	870	3070
Ike Rudman et al, Duval Townsite 1 (7-ac)	363	3000

*Failures; †Junked; ¶Million cu. ft. gas.

WHERE NEW FIELDS ARE FOUND YOU'LL FIND US

We cover the back trails, too

with our

REVIEW INTERPRETATION DEPARTMENT

Offering to others, as well as our own clients, the benefit of our years of accumulated experience in Successful Interpretations.

POINTING THE WAY

INDEPENDENT IXC **EXPLORATION**

COMPANY

FOR THE DRILL

ESPERSON BLDG. **HOUSTON, TEXAS**

EAST TEXAS

Decisive Trinity test being made at Cayuga.

* * *

Sulphur Bluff extension is smallest producer.

Palestine.—Rated as a decisive test for lower Trinity oil production on the west flank of the Cayuga field, Anderson County, Roeser & Pendleton Inc.'s Bowyer 3 showed small amount of 43 gravity green oil and small amount of gas on drill stem test at 8658 feet. Tester was set at 7603 feet, and filled one half joint with oil and 10 joints of rotary mud in 20 minutes through ⅜-inch chokes. Plans are to core about 30 feet deeper and run pipe for a production test. Assurance that it can be successfully completed as a gasser from the deep zone materialized when an estimated flow of 1,500,000 feet of gas through ⅜-inch chokes appeared when formation tester was used at 7480-7567 feet. Two previous Trinity tests drilled by Tide Water Associated Oil Company and Seaboard Oil Corporation at high points of their discovery block are profitable gas-distillate wells from the upper section of the second Glen Rose. Bowyer 3 logged top of anhydrite, last accurate marker, at 7110 feet, or 132 feet lower structurally than the nearest deep well, and is in a good position to make an oil well, if the flanks of this dome-type of structure carry oil.

Gas-distillate wells from the deep zone at Cayuga are more profitable than oil producers in the Woodbine for the few operating units that have contracts for the disposal of large volume of gas daily. Gas allowable of such wells that have a market is sufficient to produce a large volume of distillate, which is not subject to proration and commands a high price.

Cayuga North Extension

Minor north extension for Woodbine production at Cayuga occurred when Sun Oil Company's R. R. Watkins 1, J. F. Hollien Survey, Henderson County, flowed 8 barrels oil per hour through 5/16-inch choke from 2 feet of sand topped at 4118 feet, or 3771 feet sub-sea. It is low on structure, and was drilled to the approximate water level before reaching oil saturation.

Lower Trinity is to be the goal of Barnsdall Oil Company's Swanson 1, NWc of 243-acre lease, Richard Duty Survey, about ¾ mile northeast of Jarvis, Anderson County, after testing water in Woodbine. Nine-inch casing was cemented in lime at 5241 feet to protect the hole after logging top of Georgetown lime at 5217 feet, with an elevation of 330 feet. This county has received more lower Trinity tests than any other in the Woodbine basin, and failures were recently recorded for the Long Lake and Blackfoot structures.

Tide Water Associated Oil Company et al's McElreath-Suggett 2-C, second Trinity test for the Opelika structure, Henderson County, logged top of Pecan chalk at 2641 feet, and was drilling in chalk at 2700 feet. The nearby junked producer continues to make occasional heads of oil.

In the Mexia field, Pure Oil Company's Kendrick 16 was drilling at 4630 feet. Barnett Petroleum Corporation and John G. Mayo's Sanford-Garrison 1, second Trinity prospect for the Mount Enterprise faulted structure, eastern Rusk County, logged Pecan chalk at 2360-2650 feet, with an elevation of 361 feet, and was drilling shale at 3230 feet.

American Liberty Oil Company et al's Moody 1, third test for the Grapeland gas-distillate area, Houston County, reported Austin chalk at 5578-5894 feet, with an elevation of 451 feet, and cored upper Woodbine series at 5985-94 feet and recovered 5 feet of gas sand, carrying distillate odor. It affords an important extension for the gas field, as it is about 1½ miles northwest of the discovery producer.

Sulphur Bluff extended slightly to west

Talco, Texas.—Productive limits of the Sulphur Bluff field, Hopkins County, were extended 4 locations to the west last mid-week by the completion of The Texas Company's Emma Davis 1 flowing 55 barrels pipe line oil daily by heads from Paluxy at 4521-39 feet. This outpost is the smallest completion, and because of its low structural position was drilled near the water level before logging sufficient saturation to make a producer. Subsurface information indicates that structural closure takes place a short distance west of this location, which is on a narrow 300-acre lease. D. S. Hager, W. P. Luse and Russ Petroleum Company's Pierce 3, second location south of the NWc of 97-acre lease logged top of Paluxy series at 4472 feet, and saturation at 4514-4532 feet. Seven-inch pipe has been cemented to complete. Successful completion of this well will give the field a maximum width of 5 locations.

Seeking production from the lower Trinity series on the east edge of production at Talco, Magnolia Petroleum Company's J. A. Chapman 2, near most westerly NWc of 341¼-acre lease, Geo. Dyer Survey, was drilling in upper Glen Rose at 5005 feet.

Stanolind Oil & Gas Company's Hawks 1, located on the Campbell faulted structure, Hunt County, was drilling in red shale at 6260 feet, having logged base of the massive anhydrite at 5560 feet, with an elevation of 566 feet. The Travis Peak offers the only remaining production possibilities, and it has never produced in the Woodbine basin. Humble Oil & Refining Company's Riggs 1-A, located on the north side of the fault that divides the Van field, was drilling at 4110 feet in Georgetown lime, topped at 3675 feet, or about 50 feet higher than an offset junked hole.

EAST TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
JOINER AREA—		
Bert Aston & Greenway, J. R. Alford 13 (46.45-ac)	3000	3632
B. G. Byars et al, L. Jackson 5 (25-ac)	1200	3781
Chicago Oil Co., J. R. Alford 7 (22½-ac)	†	3561
J. E. Farrell & Co., W. W. Hammett-Pure 11 (100-ac)	500	3649
Federated Oil Co., W. W. Holland 5 (20-ac)	1500	3700
Florence Oil Co.-J. R. Blades, J. Cole 1 (4-ac)	240	3807
W. H. Gant-Garvin-Wegener, J. W. Garris 20 (394.58-ac)	800	3614
Gilcrease Oil Co., Bradford 11 (40-ac)	4000	3650
Hunt Prod. Co., I. R. Thrash 10 (57.33-ac)	10,600	3729
Magnolia, C. D. Ashby 8 (41.37-ac)	2500	3685
Chas. L. McMahon et al, Joe Lee 8 (63-ac)	1200	3620
M. H. McMurray, Tr., G. A. Turner 21-A (199-ac)	1500	3815
Ohio, S. H. Moores 42 (200-ac)	3000	3711
Geo. B. Ray et al, L. J. Pinkston 12 (49-ac)	9000	3610
Sinclair Prairie, Mayfield Co. 22-B (149.67-ac)	8800	3625
Staley Oil Co., H. M. Hale 11 (40¼-ac)	1500	3717
Stanolind, H. C. Maxwell 29-A (110.45-ac)	9100	3829
Texas Canadian Oil Corp., (was T. A. Johnston, Tr.), Jackson 10 (46.02-ac)	5400	3707
Willard Oil Co., John Alford 6 (21-ac)	1200	3655
Jacob H. Wood et al, D. Dickerson 3 (17-ac)	75	3577
KILGORE AREA—		
J. S. Abercrombie Co.-Harrison Oil Co., M. A. Cantrell 16 (56.11-ac)	11,800	3670
American Liberty Oil Co.-Invincible Oil Co., Weiss 13 (79.3-ac)	7000	3528
Dyck Oil Co., Blackman 8 (50-ac)	950	3681
Empire O&R Co., H. P. Leverett 14 (86.96-ac)	5000	3727
V. L. Taylor 9 (40.85-ac)	3000	3709
Gulf, A. Spear 40, Tr. 2 (96.36-ac)	10,000	3544
Henry Oil Co., S. S. Laird 9 (8-ac)	9100	3775
Humble, J. Wooley 13 (100-ac)	8300	3767
J. Wooley 14 (100-ac)	6800	3707
Roger Lacy et al, J. F. Reynolds 12 (22.89-ac)	3500	3600
J. F. Merrick et al, I&GN Ry. 1, Tr. 3 (4-ac)	3400	3656
Overton Ref. Co., E. S. Barker 1 (77-ac)	10	3686
Natural Pet. Co., G. Ephram-Magnolia 1 (54.28-ac)	*	3702
Rancho Oil Co., J. W. Bean 2, blk 4 (.628-ac)	2500	3572
Shell, J. H. Spivey 15 (102.45-ac)	9100	3730
Sinclair Prairie, M. Kennedy 5-D (32½-ac)	288	3681
Texas Co., R. B. Walls 17 (104¾-ac)	7000	3687
Tide Water Associated, Wm. Clayton 11 (60-ac)	6500	3607
W. C. Turnbow et al, Fee-Clary 1 (13/100-ac)	400	3562
G. W. Culver 6 (30-ac)	120	3535
Westgate-Greenland Oil Co., State 1 (10.94-ac)	6000	3449
R. L. Wheelock-J. L. Collins, W. M. Clayton 12 (72.34-ac)	3200	3555

Company, Well and Location	Init. Prod. Bbls.	Depth
LONGVIEW AREA—		
C. J. Atkinson et al, B. A. Skipper 4-B (21.93-ac)	35	3554
Atlantic Ref. Co., J. C. Judge 82-A (455-ac)	11,000	3627
A. L. Baggett et al, H. B. Owens 4 (22½-ac)	1500	3727
Fain-McGaha Oil Corp., A. Tooke 17-A (100-ac)	10,400	3630
Gen'l Crude Oil Co.-Pet. Finance Corp., L. Graves 9 (119-ac)	500	3652
L. Graves 10 (119-ac)	3000	3653
Gulf, W. A. Ray 17 (813.73-ac)	2000	3582
Humble, G. W. Johnson 21 (98.9-ac)	8000	3737
W. W. Lechner-G. E. Hubbard, J. M. Tuttle 5 (24.65-ac)	10,500	3577
Magnolia, Scurry Christian 4 (15-ac)	8800	3692
W. R. Nicholson 7 (49.16-ac)	7600	3670
Mudge Oil Co., J. W. Free 17-A (104.6-ac)	7500	3690
P. H. Pewitt et al, M. Phillips 7 (67.86-ac)	1500	3750
Rancho Oil Co., J. K. Edwards 17 (106-ac)	8300	3619
B. H. Rogers et al, J. Evers 4 (44.11-ac)	480	3838
Stanolind-Tide Water, G. F. Meadows 11 (49.95-ac)	6000	3714
Sun-Seaboard Oil Corp., J. M. Haynes 38 (203-ac)	9800	3589
Texas Co., T. B. Stinchcomb 10 (87.29-ac)	480	3841
Tide Water Associated, W. H. Richey 9 (43.4-ac)	6500	3550
CASS COUNTY (Rodessa)—		
Magnolia, W. M. Hall 4, Jno. N. Jackson sur	280	6067
W. M. Hall 5, Jno. N. Jackson sur	287	6045
Haywood 16, Priscilla Evans sur.	285	6020
Haywood 18, Priscilla Evans sur	220	6031
Haywood 19, Priscilla Evans sur	480	6032
Ohio Oil, R. P. Willis 13, SFIW sur	261	5955
CASS COUNTY (Rodessa)—		
Ark. La. Gas Co., George 1, Wm. R. Meyers sur	¶96	5980
Magnolia Pet. Co., Thacker & Thompson 1, Jacob Carsner sur.	*	6675
Phillips Pet. Co., Skinner 4, SFIW sur	75	5958
CASS COUNTY (Douglassville)—		
McAlester Fuel Co., J. J. Dooley 1, Calloway Davis sur	*	6508
MARION COUNTY—		
The Hunter Co., E. W. Fonda 1, A. de los Santos Coy sur	283	6096
PANOLA COUNTY—		
Socogee Gas Corp., J. M. Trosper 1, Larkin Smith sur	12	2445
SHELBY COUNTY—		
H. A. Stebbinger, Pickering Lbr. Co. 2, A. Hanson sur	¶3	5126
ANDERSON COUNTY (Cayuga)—		
Tide Water Associated-Seaboard Oil Corp., L. A. Rampy 3 (190-ac)	2000	4072
ANDERSON COUNTY (Long Lake)—		
Tide Water Associated-Seaboard Oil Corp., Monnig Bros. 7	*	9971
A. Samuel 3 (61.88-ac)	¶60	5343
Z. Williams 2 (40.28-ac)	100	5341
HENDERSON COUNTY (Cayuga)—		
Fred M. Allison Prod. Co., Pettiette-Rio 3 (99¼-ac)	3600	4097
B. H. Wathen 2 (106-ac)	2500	4108
HOPKINS COUNTY (Sulphur Bluff)—		
Empire O. & R. Co., Worsham 4 (149.26-ac)	500	4555
TITUS COUNTY (Talco)—		
Adams & Lyles, Pat Davis 3 (41.7-ac)	423	4319
Byrd & Frost Inc. et al's M. Batson-Gulf 2 (30.58-ac)	336	4281
J. Hargrove-Gulf 4 (74-ac)	353	4305
Humble, N. B. Davis 3 (102.1-ac)	24	4297
Pat Davis 2 (49.8-ac)	356	4331
A. P. King 39 (1053.36-ac)	430	4312
Monnig Dry Goods Co. 7 (114.4-ac)	429	4317
Magnolia, K. Mainard 8 (103¾-ac)	310	4287
Dr. J. S. Rushing et al, C. T. Mitchener 7 (37.2-ac)	387	4300
BOWIE COUNTY—		
Mrs. S. O. Thompson-H. H. Jaffe, C. W. Rosemond 1 (425¼-ac)	*	6016
CHEROKEE COUNTY—		
Stoco Oil Co.-Joe M. Burnham, E. B. Parks 1 (17-2/3-ac)	*	5213
LIMESTONE COUNTY—		
A. W. Phillips & J. Johnson, E. M. Speight-Wright (136-ac)	*	3695
SMITH COUNTY—		
Thos. W. Doswell et al, P. C. Allred		

*Failures; †Junked; ¶Million cu. ft. gas.

SOUTH TEXAS

New Nueces field and Cole sand wildcat in Jim Wells.

* * *

Duval County drilling takes another spurt.

* * *

Edwards County test has water under slight show.

Corpus Christi.—Seaboard Oil Corporation was preparing to make a production test in J. P. Luby 1, which is opening the tenth oil field in Nueces County. The well is located about seven miles southwest of the London area and is in the southeast corner of Block 4, Section 2, Luby subdivision.

A seven-hour drill stem test was run after casing was perforated at 5045-50 feet. The well flowed at the rate of 13 barrels of pipe line oil per hour through 3/16-inch chokes, top and bottom. Working pressure during the test was 500 pounds. Late June 11, tubing was being run preparatory to regular completion.

The well had drilled to 5332 feet, having had an oil sand at 4319-37 feet which showed excellent pressure and some 51 gravity oil on drill stem tests. A second sand at 5028-47 showed lots of pressure and considerable 44.9 gravity crude. The next ten feet to 5057 feet carried oil odor in a sandy shale, but developed a little water with the oil. Casing was landed at 5132 feet.

Sandia Outpost Important

One of the outstanding strikes of the week was Smith Drilling Company's W. D. Wade 1, one mile east of the Wade-Sandia area in northeastern Jim Wells County. The well was flowing 51 gravity crude at the rate of 62 barrels per day through 5/32-inch choke under pressures of 1750 pounds on tubing and 1850 pounds on casing. The test had been drilled to 5701 feet, plugged back, set casing at 5212 feet and perforated at 5159-65 feet with nine shots.

The high importance of the test is that it is producing from the Jackson series, likely the Cole sand. The nearest similar Jackson production is in the Mirando district, at least 50 miles to the west and the Lucas district, about half that distance to the north.

This discovery indicates that a new trend of exploration will result in this district, which will cover considerable of the present Frio producing districts. The deepest production in this field before the new discovery was in the Frio at 4100 feet.

A fourth producing zone for the western extension to Premont Field, Jim Wells County, was in the making with H. H. Presnall's J. Hofbauer 1, lots 22 and 27, section 72, making some oil after perforating casing at 3487-91 feet with 20 shots. It is perforating again. The well logged sand at 3486-3501 feet.

New Heyser Zone

A new producing horizon, third for the field, was established in the Heyser Area, Victoria and Calhoun Counties, when Commonwealth Oil & Gas Company's W. H. Bennett 4, was completed for eight barrels of 36.4 gravity oil per hour through 9/64-inch choke. The well, drilled to 5747 feet after making a gasser in the regular 5450-foot horizon. Casing was perforated at 5742-46 feet. Both of the sands are in the Frio. A Heterostegina sand at 4875 feet produced some crude.

In the Ganado field, Jackson County, The Texas Company has reworked M. Hultquest 1, after showing too much gas, and the well is flowing about 4 barrels of oil per hour through 12/64-inch choke with 1800 pounds tubing and 1925 pounds casing pressure. The well is bottomed at 5150 feet with casing perforated at 5097-5106 feet.

A twin well drilling program has been launched in the McCampbell field, Aransas County, two new operations being announced during the week, both being by Buckingham Oil Company. The tests, directed to the 7100-foot sand, will be 90 feet from present producers in shallower sands.

Barnsdall Oil Company's Edwards 1-A, on the Lamar Prospect, also in Aransas County, had reached 8500 feet on its deep project.

United Production Corporation tested salt water through perforations in Harvey 1, southwest side of the Agua Dulce field, Nueces County, after perforating at 7376-84 feet. This well had previously tested oil and salt water. It likely will be recemented and tested again. About ten miles southwest of this well across the Kleberg County line, Camp Production Company's Wardner 2, had derrick up for test to the same sand, while Lockhart et al's Purl 1 in the main Agua Dulce field, was coring below 6750 feet.

A deep exploratory campaign is attempting to open production to possibly 9000 feet on the east flank of the Refugio field, Refugio County. United

Production Corporation was at 8825 feet in the Vicksburg in J. J. O'Brien 12. About 2400 feet to the north, Edwin M. Jones has commenced Ben Shelton 1, another test to 9000 feet.

Midway field, San Patricio County, was being extended ¾-mile to the north by Phillips Petroleum Company's Ivey 1, which was in final stages of completion as the week closed. It cored gas sand 5281 feet, oil sand 5335-45 feet and oil and water sand 5345-54 feet, being bottomed at 5410 feet in shale.

Discover new Cole sand field in Duval County

San Diego.—Discovery of a new Cole sand field west of Freer and commencement of an outpost drilling boom in the Sweden area featured Duval County developments during the week. The aggressive program of operators in the latter pool indicate that it will be one of South Texas most important oil fields.

The new discovery is Government Wells Oil Company's H. A. Lundell 1, which encountered a very gassy sand cap at 1513-15 feet and oil sand at 1515-20 feet. A drill stem test of the full section developed 260 pounds pressure in seven minutes through ⅜-inch choke, top and bottom. Casing was landed at 1513 and plugs were being drilled as the week closed. Sand is in Cole section of Jackson series.

The test is located 2717 feet from the east line and 1186 feet from the north line of Section 140, and is nearly 1½ miles west of the Government Wells field, proper. Despite its reasonable close proximity, this is looked upon as an entirely new discovery, on trend with the Piedra Lumbre, Colmena production.

North Sweden Busy

North Sweden area, with a proven area of some 350 acres, during the week saw the staking of a number of key outpost wells. Standard Oil Company of Kansas acquired 80 acres of the Atlee Parr land from Hiawatha Oil & Gas Company, and is building rig over location one mile south of production. One mile to the west of the present field, Navarro Oil Company has staked Rossi 1, 330 feet from the northeast corner of the south 100 acres of east one-half Section 11. This company recently acquired 357 acres for $357,000, half cash and half oil with an agreement to drill within 30 days. Retaining the 100 acres upon which the well is to be drilled and 57 acres at the north of tract, the remainder was sold to Humble Oil & Refining Company for an unannounced consideration. Woodley Petroleum Corporation and Frank Gravis, each, are to drill wells about 1½ miles east and northeast of present production.

In the main field, nine rigs are running, all directed to the 4750-foot sand in the Jackson, locally defined as being Government Wells. This field received a west extension of several thousand feet by Reynosa Oil Company's F. G. Wilson 1, which flowed 115 barrels of oil in 24 hours through ¼-inch choke and showed 750 pounds working pressure. It is in sand at 4763-75 feet.

Thomas & Lockhart's Parr 2, north offset to the discovery well of the Thomas-Lockhart field, Duval County, has been abandoned at 4904 feet after tests failed to develop commercial production.

Edwin M. Jones' H. Ezzell 4, discovery well of the Ezzell Ranch field, McMullen County, was regauged through ½-inch choke, and flowed 480 barrels of 19.7 gravity crude in 24 hours with working pressure ranging from 45 to 50 pounds and casing pressure standing at 310 pounds. It is in sand at 1527-34 feet. A new test has been started one location west.

Several miles north of this field, Jones' Ezzell 1, completed as a gasser several months ago, blew out about 50 feet from the casing and started to crater. It was controlled and crater is being killed.

Edwards test shut down

San Antonio.—Dan Auld et al's Mrs. Mamie Rigsby, northeast of Rock Springs in Edwards County, was shut down for orders at 3952 feet after encountering hot salt water in the Ellenberger. The well found hard dry lime at 3922-43 feet, after bailing 1 bailer of 26 gravity sweet oil which had seeped into the hole in 12 hours from 3920-22 feet. The bit then went into a section from 3943-50 feet where a bailer of hot salt water was recovered hourly. It is now shut down at 3952 feet in hard lime. Elevation is 2291 feet and top of Ellenberger is carried at 3874 feet.

South Texas deepest drilling operation is in the Pearsall field, Frio County, where Amerada Petroleum Corporation's Halff & Oppenheimer 8 is drilling below 10,335 feet in sandy lime. Top of Travis Peak was logged at 10,045 feet.

Tom O'Connor hearing reset for June 14.

Austin.—Hearing on the Tom O'Connor field has been reset by the Texas Railroad Commission for June 14.

Attorney Rayborne Thompson had asked the hearing on behalf of several operators in Tom O'Connor to discuss two phases of regulating the field; first, the method of allocation, and second, whether production shall be from one to two sands.

Texas Grants 311 Permits

Austin.—The Texas Railroad Commission approved last week permits for drilling 311 new wells in Texas, 8 less than were allowed the week before.

In the East Texas field there were 3 new locations, 1 each in Gregg, Upshur and Rusk counties. The East Central Texas district reported 26 locations, all scattered.

West Texas reported 59 permits, including 16 in Winkler, 11 in Ward County, 11 in Ector County, and 10 in Upton County. The Panhandle area reported 40 permits.

There were 48 locations from the North Texas district, 13 being in Young County. West Central Texas listed 28 locations.

There were 52 permits for wells in the Gulf Coast district, including 10 in Nueces County. Southwest Texas reported 55 permits, 18 being in Duval County.

SAVE MONEY!

Use bits hard faced and hard set with

Modern Up-to-date OSAGE METAL

Here's visible evidence of what *modern* Osage metal will do. The above picture shows two bits, set with *modern* Osage electric inserts and hard faced with *modern* Osage electric amalgamated rod, after a very unusual r u n. These bits averaged 1,013 feet each in the same digging where the average footage per bit had been about 700 feet.

Manufactured by

OSAGE METAL CO. Inc.

1900 N. Eastern Oklahoma City

OSAGE

Write for our descriptive catalog—today

OSAGE products distributed by:

WESSENDORFF NELMS & CO., Houston, Corpus Christi and Tyler, Texas; BIG THREE WELDING EQUIPMENT CO., Houston and Fort Worth, Texas, Oklahoma City and Tulsa, Oklahoma; HOUSTON OXYGEN CO., Houston, Texas; CORPUS CHRISTI OXYGEN CO., Corpus Christi, Texas; LAYNE-ATLANTIC COMPANY, Norfolk, Virginia; MODERN ENGINEERING CO., St. Louis, Missouri; CONSUMER'S OXYGEN CO., New Orleans, Louisiana; THE LOUISIANA SUPPLY CO., Sulphur, Louisiana; THE DENVER OXYGEN CO., Denver, Colorado.

SOUTH TEXAS

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CORPUS CHRISTI DISTRICT		
ARANSAS COUNTY—		
Buckingham Oil Co., McCampbell Ranch 6A, James Orrick sur (McCampbell), perf 6782-94	200	7853
BEE COUNTY—		
Illinois Pet. Corp., McKinney 2, L. C. Randolph sur, ½ mi ne No. 1 (Dirks)	*	4264
W. C. McBride Inc., Plummer 1-B, Chessman sur (Plummer)	250	3059
Salt Dome Oil Corp., F. W. Striebback 1, J. M. Uranga gr (W. Tuleta)	30	3145
Fred Shields et al, Homer Harris 1, s½ blk 4, Catlett & O'Neil sub, P. Wilcox sur, 6 mi w Beeville	*	4821
CALHOUN COUNTY—		
Humble & Plymouth, P. H. Welder 1, Sisneros sur (Heyser)	650	5452
P. H. Welder 16-A, J. M. Rios sur (Heyser)	650	5496
HIDALGO COUNTY—		
Dayle L. Smith Oil Co., Fairbanks & Young 1, 2500 ft n of Highway 4, 3 mi e of Samfordyce field, 195 ft sl & el of 576-ac tr, blk 14, porc 46	*	2350
JIM WELLS COUNTY—		
Smith Drlg. Co., W. D. Wade 1, 1 mi e of production, Bode subd (Sandia), perf 5159-63	¶5 & 100	5701
NUECES COUNTY—		
I. J. Allen & Seaboard Oil Co., J. O. Chapman et al 5, Ramon de Ynojosa gr (Chapman Ranch)	*	6494
Great State Oil Corp. & Violet, McGregor-Belk 9, lease in sur 311 (Saxet)	750	6738
Humble & Barnsdall, H. Brown 1, Flour Bluff & Encinal Garden tr subd 20-ac tr (Flour Bluff)	650	6670
R. A. Gulden 5, Flour Bluff & Encinal Gardens Tracts (Flour Bluff)	750	6669
F. G. & Kate Ritter 1, Flour Bluff & Encinal Gardens Tracts (Flour Bluff)	750	6658
L. A. Webb 5, Flour Bluff & Encinal Gardens subd (Flour Bluff)	750	6666
Navarro Oil Co., E. M. Poenisch 1, lot 21, blk 41, Flour Bluff & Encinal Garden tr, 3½ mi w Flour Bluff field	*	....
Pan American Prod Co., Solar-Sevier 1A, W. S. McGregor sur, sur 582 (Saxet)	650	6273
Sancor Oil Co., T. H. Isenseel, H. B. Shepherd Farm Lots (Saxet)	850	4557
Sloan-Harvey & Green River Oil, Eno Cassens 1, 330 ft wl, 2000 ft nl of sec 26, Agua Dulce farm lots, Benton Pasture subd, Antonio Longorio gr, 1 mi s Agua Dulce townsite	*	....
REFUGIO COUNTY—		
Chew & McIntyre, Willie & Emma Deaman 1, 339 ft wl, 1650 ft sl of w½ sec 16 (315.3-ac tr), Bonnie View subd, 1½ mi se Bonnie View School	*	....
Cosmo Petr. Co., F. V. W. Heard 16, Refugio Town Tract sur (Refugio)	375	4940
Hewitt & Dougherty, M. F. Lambert 43, Swisher sur 7 (Tomoconnor)	1250	5900
Nordan & Morris, Tom O'Conner 10, James Hewitson sur (Tom O'Connor)	850	5910
United Prod. Corp., M. F. Lambert 42, Swisher sur A-397 (Tom O'Connor)	1250	5910
SAN PATRICIO COUNTY—		
Humble, Blaschke & Mayo 2, Taft farm lands (Plymouth)	475	5652
VICTORIA COUNTY—		
Barnsdall & American Liberty, Pickering-Roos 17, SA&MG sur 6 (Placedo)	750	4763
Portilla Drilling Co., T. Traylor 1, SA&MG sur (Placedo)	¶15	6050
E. L. Smith Co. Inc., S. E. Wright 3, J. M. Brownson sur (Placedo)	450	4775
Superior Oil & Gas Co. et al, J. Hosek 9, SA&MG RR sur No. 7 (Placedo)	450	4779
SAN ANTONIO DISTRICT		
BEXAR COUNTY—		
Carle Chemical Co., F. P. Carle 1	*	311
Shadrock Oil Co., J. Barrogan 9, J. S. Simpson sur (Von Ormy)	5	655
J. Barrogan 10, J. S. Simpson sur (Von Ormy)	5	660
Virginia Oil Co., A. W. Bitter 1, J. M. Baerrera sur (Von Ormy)	4	503
CALDWELL COUNTY—		
Fred J. Adams, W. M. Ellison 8, D. Cooper sur (Branyon)	60	2314
Blundell Oil Co., M. L. Luce 3, J. A. Neill sur (Branyon)	18	2112
Chiquita Oil Co., W. W. Hickman 5, G. Hinds sur (Salt Flats)	150	2639
C. F. Robertson 5, J. A. Neil sur (Branyon)	200	2215
E. R. Cosby, W. H. Cosby 1, 1900 ft nel, 150 ft nwl 114-ac tr, Maxwell sur	*	1847
Easton & Manning, W. E. Lawler 5, J. Pinchback sur (Branyon)	10	2190
Lanning & Coffield, C. B. Corder 2, J. A. Nejll sur (Branyon)	125	2135
Lincoln Pet. Co., W. M. Calliham 5, Dillard Cooper sur (Branyon)	600	2065
Magnolia, W. J. Tiller 14, J. Henry sur (Luling)	150	....
Martell Pet. Co., J. E. McMahan 1-A, J. Pinchback sur (Branyon)	*	2111
B. F. Robertson, J. M. Young 1, J. R. Miller sur (Branyon)	40	2200
W. M. Vaughey, W. S. Clark 1, J. R. Miller sur (Branyon)	180	2180
R. S. Wyrick, S. F. Magee 2, J. A. Neill sur (Branyon)	732	....
GONZALES COUNTY—		
Tull et al, J. F. Bozke 1, B. McClure sur, owdd, former td 2200	*	2625
GUADALUPE COUNTY—		
Saxet Prod. Co., E. Grimm 5, G. Dewitt sur (S. Darst Creek)	125	2580
MEDINA COUNTY—		
Gates, Hill & Mead, E. Kreisle 1, sec 908	*	60
MILAM COUNTY—		
Alez Krayse et al, J. F. Bartek 1, 150 ft nl 959 ft el 87-ac tr, J. de Pena league	*	1924
WILLIAMSON COUNTY—		
Taylor Ref. Co., W. R. Heap 9-B, H. White sur (Byersville)	*	875
LAREDO DISTRICT		
DUVAL COUNTY—		
Central Producers Inc., J. & M. Luptack 4, sec 41 (Gov't Wells)	¶3 & 5	2442
Hamill & Smith, C. W. Hahl 12, sec 63 (Loma Novia)	320	2585
Humble, Dowdy-Fee 15, BS&F sur (Seven Sisters)	*	2578
Roos Brothers 2, sur 119 (Labbe)	475	2855
Mucio Vela 13, sec 42, TTRR sur (Loma Novia)	350	2687
Magnolia, Servando Benavides 28, blk 31, Seacoard subd (Cole-O'Hern)	1018	2849
A. L. Labbe 4, sur 1 (Labbe)	¶15	2884
John J. O'Hern, S. Benavides 5-C, blk 25 (Cole-O'Hern)	240	2883
Reliance Oil & Roy. Co., D. Ruiz Est. 2, 925 ft el, 2640 ft nl C&M Ry sur 125 (Hoffman)	35	2649
Seaport Oil & Gas Co., Duval County Ranch Co. 7A, sur 574 (Sarnosa)	*	2435
The Texas Co., Duval County Ranch Co. 23, sur 100 (Piedre Lumbre)	*	Icn.
Thomas Est. & Lockhart Bros., Lillian (Atlee) Parr 2, E. H. Valentine sur 26 (Thomas-Lockhart)	*	4904
McMULLEN COUNTY—		
Harrison & Danvers, J. A. Jungman 1, 230 ft sl & 230 ft el of 100-ac tr No. 4 M. Hely sur	*	1270
National Pet. Corp., Charles T. Lark et al 3-C, E. W. B. Scrugham sur.	50	978
STARR COUNTY—		
C. T. Daye et al, Seabury et al 1, J. of Camargo sur (Los A'mos)	*	375
K. E. Merren, Starr County Cattle Co. 1-A, 625 ft el, 395 ft sl of blk 34 of Jefferies & Lambeth subd in por 89, 275 ft s of No. 1	800	5418
Sun, M. Guerra & Sons 9-B, Las Cuevitas gr (Cuevitas)	300	2255
WEBB COUNTY—		
W. C. Billings, Fee 3, sur 100 (Lopez)	120	2316
Mills Benentt Prod. Co., M. D. Slator 3, 990 ft swl, 330 ft nwl blk 92, Slator subd of Borrego gr	*	1551
C. C. Bonner et al, Cuellar Bros. 1, sh 4 Cuellar gr (Cole-Bruni), 3177 ft nel, 330 ft nwl sh 4 Cuellar gr	*	2950
Dolores Oil Co., Emma Adami 1, 660 ft nl & el se¼ sur 15	*	1501
O. W. Killam, A. M. Bruni 52, sur 8, Foltz sub (Cole-Bruni)	270	3433
Laurell Bros., 2 sur 33 (Killam)	102	2041
Sun, S. Benavides (Brennan) 10, blk 441, Hale subd Arispe gr (Cole-O'Hern)	49	2938
Superior Oil Co., W. C. Billings 23, sec 109 (Lopez)	123	2289
W. C. Billings 24, sec 109 CCSD&RGNG sur (Lonez)	80	2288
ZAPATA COUNTY—		
Earl Callaway, Belen Bustamente 9, sh 8, Fansler partition, Comitas gr (Escobas)	45	1195
Elvira B. de los Santos 10, sh 7, Comitas gr (Escobas)	33	1227
Dulup Oil Co., Mrs. J. G. Trevino 26 (1), sur 412 (Escobas)	*	Icn.
H. Q. Lewis, S. Benavides 1, 200 ft nwl, 200 ft swl of e¼ blk 39, Fansler & O'Hern sub, Villa gr	*	2203
Nordan & Morris, C. Bustamante 21, sh 33, Fansler part, Comitas gr (Escobas)	21	1247
Valley Osage Drlg. Co., A. D. Haynes 3-B, sec 14, Haynes subd (Comitas)	*	1181

*Failures; †Junked; ¶Million cu. ft. gas.

Barbacoas Yegua sand discovery flows 396 barrels

Mission.—K. E. Merren's Starr County Cattle Company 1-A, discovery well of Yegua sand production (likely Conroe) in the Barbacoas field, Starr County, flowed 396 barrels of 58 gravity amber colored fluid on a 24-hour gauge through chokes ranging from 1/32 to 5/32 inch. The well is flowing under pressures of 2200 pounds on tubing and 2350 pounds on casing.

This well topped the sand section somewhere below 5358 feet, core recovery being poor to 5385 feet. The sand and shale section continued to 5417 feet. After 7-inch casing was set at 5353 feet, 280 feet of 5-3/16-inch liner was set to the bottom of the hole and perforated at 5376-98 feet.

This is the first production in this horizon in this general district. Heretofore, all the oil has been from the Catahoula and Frio. This new discovery, therefore, indicates that many of the old structures will be redrilled to test these lower sands.

The new well is located 625 feet from the east line and 395 feet from the south line of Block 34, Jeffries-Lambeth Subdivision, Porcion 89.

In Brooks County, Standard Oil Company of Texas continues to encounter oil sands in Mestina Oil & Gas Company 1, Lease 2, about 6 miles north of the Alta Mesa field. Sand and streaks of shale were cored at 5156-63 feet and a test was being run.

Standard Oil Company of Texas' Mestina 5, in the main Alta Mesa field, found a sand at 4529-37 feet, then hard sand and shale to 4238 feet. It was running a test.

Shell Petroleum Corporation's Yturria Land & Cattle Company 1, deepest well ever drilled in the Rio Grande Valley, was below 10,275 feet and in sandy shale. It is in La Sal Viejo field, Willacy County. Cameron County has three active deep wells. Stapper Petroleum Corporation's Port Isabel 1 was around 8000 feet, and was having trouble with heaving shale. Rowan & Hope, Inc., is starting Saxet Production Company et al's Port Isabel 1, projected to possibly 8500 feet, while Ruez-Morton's United 1 is down 3250 feet on a 7500-foot contract.

Takes Geophysical Option

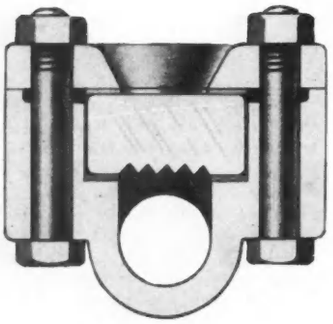
Carthage,—J. E. Sedberry has taken a geophysical option on all the land owned by Temple Lumber Company in Sabine County, Texas. In the southwest part of Harrison County in the James Hill and Alston Ferguson Surveys, The Texas Company has been buying some scattered leases. Near Joaquin, Shelby County, Gulf Oil Corporation continues to make a few purchases.

INFERNO
Reflex Gauges and Stainless Valves

PRISM GLASS—Thick, strong, safe. Dark to the fluid level; silver above. Patented.

STAINLESS STEEL Valves — the finest made. Will not corrode under any conditions. Factory tested to 2,000 lbs. Recommended for working pressures to 1,000 lbs. NOT made with automatic ball checks, which most states prohibit. Sealed open.

They comply with state, federal and A. S. M. E. requirements. Types for EVERY PURPOSE. Ask for Bulletin No. 7.



THE
INFERNO
CO.
P. O. Box 1138
SHREVEPORT, LOUISIANA
Makers of Better Steam Equipment
Have You Taken the Peace Pledge? Write for Information.

TEXAS GULF COAST

Deep Matagorda County wildcat attempts to blow out.

* * *

Two extension wells at Magnet core oil sands.

Houston.—Three miles southwest of Buckeye, Matagorda County, United North & South Development Company's Stoddard 1, M. Cotton Survey, tried to blow out last week, kicking 15-pound drilling mud up in the derrick. The crew was preparing to pull a core at 9972 feet when it started showing gas in the return column. Instead of pulling the core out the well was brought under control by heavy drilling mud.

Stoddard 1 has failed to show commercial oil on several production tests. The last test made was from 9925 to 9945 feet, when the well swabbed and showed only a little oil and gas. The hole was then cored to 9952 feet where a sand showed oil.

Twenty Feet of Solid Oil Sand

Twenty feet of solid oil sand were cored in Atlantic Refining Company's Cockburn Fee 1, 1700 feet northwest of production at Magnet field, Smith & McKenzie Survey, Wharton County. Seven-inch casing has been cemented at 5541 feet and a production test will be made next week. Oil sand was logged from 5520 to 5541 feet; gas sand was topped at 5518 feet.

If Atlantic Refining Company's Cockburn Fee 1 is a commercial producer it will be the first in the district. The test logged the top of Discorbis at 4902 feet, Heterostegina at 5062 feet, and Marginulina at 5332 feet.

East of the discovery well at Magnet, Texas Crusaders Oil Company's Sweet 1, Smith & McKenzie Survey, Wharton County, was preparing to set casing after running an electrical logging device at 5555 feet. Sand showing oil was logged from 5531 to 5537 feet and from 5540 to 5555 feet.

Southwest of the discovery well at Sandy Point, Brazoria County, Jack Frazier's Sharp 1, G. S. Gorbett Survey, was abandoned at 7011 feet, being the first failure for the field. It logged salt water at 6682 feet.

Harrison & Abercrombie have two important wells at Old Ocean field, Brazoria County. Bernard 1-A, a work over, was drilled to 10,059 feet and a fishing job encountered. Plugged back to 9827 feet and redrilled to 9878 feet in shale, a sand showing oil was encountered in the sidetracked hole from 9826 to 9838 feet and from 9838 to 9845 feet. Five-inch casing set at 9845 feet will be perforated the coming week for a production test. Bernard 4 was drilling ahead below 10,156 feet in shale.

Three Hastings Extensions

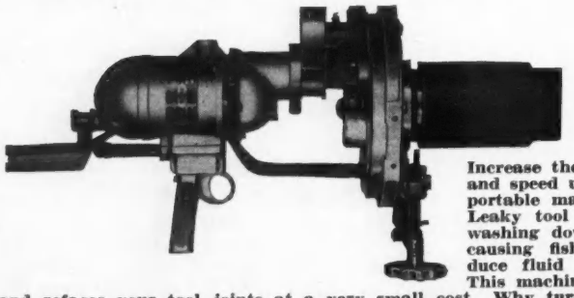
Hastings field, Brazoria County, was extended one location north, east, and west last week by Navarro Oil Company, Humble Oil & Refining Company, and Stanolind Oil & Gas Company.

On the north flank of Hastings, Navarro Oil Company completed Beers A-2, Perry & Austin Survey, flowing 26 barrels of pipe line oil per hour through a ¼-inch choke from 6108 feet. Seven-inch casing was set at 6089 feet. On the east side of the field, Humble Oil & Gas Refining Company's Haden 1, R. Hopel Survey, made 25 barrels per hour through a quarter-inch choke. On the west side of the field Stanolind Oil & Gas Company's Curkeet 5, H. & T. B. Survey 30, was completed at 6080 feet for 430 barrels in 13 hours through a quarter-inch choke.

Outpost Location at Anahuac

Humble Oil & Refining Company announced another outpost location at Anahuac, Chambers County. Over two miles southeast of production, Middleton D-1 is 466 feet east of the west line and 466 feet south of the north line of H. & T. B. Survey 110, Abstract 466. This is the second outpost location Humble Oil & Refining Company has announced in the past week, the first being Garth 1 over 1½ miles east of production at Anahuac. Garth 1 is 466 feet from the south and west lines of T. & N. O. Survey, Section 68, Chambers County.

The second profitable well for South Cotton Lake field, Chambers County, is Salt Dome Oil Corporation's Lawrence C-2, 660 feet north of production. The



ATTENTION DRILLING CONTRACTORS

Increase the life of your tool joints, and speed up drilling by use of this portable machine.
Leaky tool joints are hazardous in washing down mud plaster on wall, causing fishing jobs, and also reduce fluid pressure at drilling bit. This machine comes to the location, and refaces your tool joints at a very small cost. Why turn a new thread, when a new shoulder will do? If your tool joints are leaking let us give you a free demonstration. We also specialize in welding and boiler work. Give us a trial.

HOLDER WELDING COMPANY

DUNCAN, OKLAHOMA Phone 1149 | ADA, OKLAHOMA Phone 1984 | GREAT BEND, KANSAS Phone 797

well made 436 barrels of pipe line oil daily from 6509 feet through a quarter-inch choke, with a tubing pressure of 590 pounds and a casing pressure of 1050 pounds. Oil sand was logged from 6498 to 6509 feet and seven-inch casing was set at 6504 feet.

At Seabreeze, Chambers County, Sun Oil Company's Acom 1, H&TB Survey, Section 103, was drilling in shale at 8464 feet after coring a sand and shale showing oil and gas from 8347 to 8377 feet.

East of production at Silsbee, Hardin County, Republic Production Company completed Brooks 14, G. W. Brooks Survey, at 6915 feet. The extension well made 315 barrels of pipe line oil daily through ¼-inch choke, with tubing pressure of 1650 pounds and casing pressure of 2000 pounds. Oil sand was topped at 6898 feet, and 7-inch casing was cemented at 6908 feet.

Cheek Wildcat Will Be Tested

Magnolia Petroleum Company was preparing to make a test on Phelan 1, southwest of Amelia field and in the Cheek area, S. Stivers Survey, Jefferson County, from 8350 to 8460 feet, where a gas sand was logged. It was drilled to 8602 feet, and 7-inch casing was set at 8454 feet, after the hole had been plugged back.

North of Amelia and in the West Beaumont area, Jefferson County, Sun Oil Company made its first location last week. Gailey 1 is 330 feet north and west of the southeast corner of a 40-acre tract in the A. Houston Survey.

TEXAS GULF COAST
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
AMELIA—		
Humble, Dishman B-1	696	6777
Fitzgerald 1	720	6779
Gist Realty Co. 1	*	lcn.
Quinn 6	672	6777
Normandie Oil Co., Peveto 2	680	6779
Glenn H. McCarthy, Longe B-5	113	5412
ANAHUAC—		
Humble, Clark 11	696	7080
Broussard, Hebert 12	624	7080
BOLING—		
Mackhank Oil Co., Farmer C-5	290	4634
DICKINSON—		
Turman Oil Co., Maco Stewart 1	536	8926
FAIRBANKS—		
Amerada-Stanolind, Jacobs 1	103	6828
HASTINGS—		
Humble, Brown 12	600	6080
Haden 2	600	6080
Navarro Oil Co., Beers A-2	624	6108
Stanolind, Crukeet 5	648	6080
S. Paul 7	649	6080
Surface 5	641	6080
NOME—		
Shell, Unit B-2	516	6050
HUMBLE—		
Hill & Wren 1	120	3007
LIVINGSTON—		
Owenby Dr. Co., Pratt 10	¶1	4220
SANDY POINT—		
Jack Frazier, Sharp 1	*	7011
SILSBEE—		
Republic Prod. Co., Fee 14	315	6915
SOUTH COTTON LAKE—		
Salt Dome Oil Corp., Lawrence 2-C	436	6509
TOMBALL—		
Humble, Rudel 5	¶2¾	5575
WITHERS—		
Texas Co., Pierce Estate C-29	162	5560
BRAZOS COUNTY—		
Francis Stone Oil Co., Graham 1, s of College Station, R. Stevenson sur	*	2267
FT. BEND COUNTY—		
John Byers, Lockwood Sharp 1, Smithers Lake area, Wm. McMahon sur	*	6520

*Failures; †Junked; ¶Million cu. ft. gas.

Long Lake wildcat completion due about June 20.

* * *

Gillis-English Bayou graben is proven productive.

Lake Charles.—There will be a slight delay in completion of Fohs Oil Company & Pilgrim Exploration Company's State Long Lake 1, potential discovery well of a new field in the Louisiana Gulf Coast, Section 65-17s-19e, Lafourche Parish, due to boiler trouble. At the end of the week the crew was repairing boilers after seven-inch casing was cemented at 9389 feet. The casing was cemented onto a string of 9⅝-inch casing which had been set at 8384 feet.

Unfortunately, the boiler trouble occurred while the crew was setting the seven-inch casing and it is not known whether a good cement job was obtained. If the job is satisfactory plugs will be drilled and the well completed around June 19 or 20.

State Long Lake 1 topped oil sand at 9368 feet and started coring the formation at 9370 feet. The hole was cored down to 9406 feet, over 30 feet of Miocene sand showing oil and some shale being recorded.

The two companies have around 7400 acres at Long Lake, and Shell Petroleum Corporation and Gulf Refining Company control several hundred acres in the area. Fohs Oil Company is operating the leases at Long Lake, while Pilgrim Exploration Company is standing half the cost.

Pilgrim Exploration Company, which owns half interest in Fohs Oil Company's leases, is an eastern concern known as the Mayflower Associates of which R. E. McConnell is president. The company has several other producing properties in Texas and Louisiana.

Acadia Parish Wildcat Disappoints

Humble Oil & Refining Company's Federal Land Bank 1, North Crowley prospect, Section 34-8s-1e, Acadia Parish, proved disappointing last week when salt water was shown on a six-minute drill stem test. After the test 20 feet of pipe was lost in the hole forcing the company to plug back to 7425 feet preparatory to sidetracking and drilling down to the broken sand showing oil.

Federal Land Bank 1 cored broken sand and shale showing oil from 7929 to 7939 feet, and after attempting three drill stem tests which failed, the hole was cored down to 8037 feet. A drill stem test was made from sands at 7985 to 8037 feet and the seat gave way to 8009 feet. After the testing tool was open six minutes the wildcat showed 180 feet of gas cut mud, 690 feet of salt water and mud and 60 feet of sand.

Another good producer was completed on the west side of Jennings, Acadia Parish, when W. T. Burton completed J. J. Robira 1, Section 41-9s-2w, after perforating casing at three different levels. Robira 1 was drilled to 6904 feet in sand and shale showing oil after logging top of the broken formation at 6747 feet. Seven-inch casing was cemented at 6747 feet and perforated with 40 holes from 6592 to 6612 feet, 50 holes from 6756 to 6777 feet, and 79 holes from 6791 to 6821 feet. The well came in flowing 640 barrels of 31.8 gravity pipe line oil daily through a quarter-inch choke, with a tubing pressure of 1075 pounds and a casing pressure of 1300 pounds.

The first deep graben oil between Gillis and English Bayou fields, Calcasieu Parish, was discovered by Union Sulphur Company's Castle 7, Section 14-9s-8w, when the well came in flowing 510 barrels of 41.7 gravity oil daily through a 13/64-inch choke, with a tubing pressure of 1150 pounds. Drilled to 7119 feet in sand showing oil, top of the sand was penetrated at 7116 feet and seven-inch casing was set at 7111 feet. At this horizon the well tested salt water. Plugged back to 7086 feet, casing was perforated with 36 holes from 7074 to 7085 feet and the well came in flowing pipe line oil.

The first well drilled in the Gulf of Mexico will be Superior Oil Producing Company and Pure Oil Company's State Gulf of Mexico 1. The permit has

SOUTH LOUISIANA
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ENGLISH BAYOU—		
Union Sulphur Co., Castle 7	510	7085
IOWA—		
Shell, Heyd 21	579	4460
JENNINGS—		
W. T. Burton, Robira 1	640	6904
VINTON—		
Wilson Broach, Fee 6	*	3328
WEST HACKBERRY—		
W. T. Burton, R. Vincent 2	490	4492
LAFOURCHE PARISH—		
William Helis, City of New Orleans 1, Marchland prospect, 19-23s-23e	*	8012
PLAQUEMINES PARISH—		
Gulf, State Bay Adams 1, in Bay Adams, 32-19s-28e	*	4678

*Failures; †Junked; ¶Million cu. ft. gas.

been approved by officials in Washington and the company is driving piling off the shore of Cameron Parish. It is understood the workers are having trouble with the driving due to wave action.

In Jefferson Davis Parish, Louisiana Crusader Oil Company's Langley 1, Fenton area, Section 36-7s-5w, was shut down after running an electrical logging device to 8575 feet. Eight ohms and 120 milivolts in sands from 7358 to 7367 feet were indicated. It is not known whether the operators will make another test of this sand. The first showed water and a little gas.

Black Prince Island Wildcat Sets Casing

Amerada Petroleum Corporation & Louisiana Land & Exploration Company's State Bayou Des Allemands 1, Black Prince Island prospect, Section 13-15s-20e, St. Charles Parish, was waiting on cement to set at the end of the week after running a string of 9⅝-inch casing to 7124 feet. An electrical logging device showed eight ohms from 6820 to 6833 feet and six ohms from 6850 to 6856 feet. Sand body was cored in the wildcat from 6820 to 6878 feet, below which the bit went into salt water sand down to 7124 feet.

Another 10,000-Foot Test in South Louisiana

Another 10,000-foot well for the Louisiana Gulf Coast is Shell Petroleum Corporation's Pelican 1, Gibson field, Section 35-17s-15e, Terrebonne Parish. The well was drilling below 10,019 feet after missing the regular producing sand at Gibson.

The Texas Company's Horseshoe Bayou 1, on Horseshoe Bayou, St. Mary Parish, which blew out at 12,261 feet, caught fire and destroyed the derrick floor, was ready to resume drilling at the end of the week. The company has erected a drilling barge over the hole.

NORTH LOUISIANA

Deep test below 10,000; may go 12,000 feet.

* * *

Rodessa activity practically confined to northwest.

Shreveport.—The northwest offshoot of the Rodessa field in Caddo Parish, Louisiana, and Cass County, Texas, with the recently opened 8½-mile extension into Marion County, Texas, are the only spots in Rodessa where activity in that area continues at the former Rodessa pace that until the last fortnight had been very brisk.

Several months ago Bay Oil Corporation completed an 80-barrel daily producer at George Parker 1, G. Crowder Survey, Cass County, over a mile northwest of production. During the last week W. G. Ray Drilling Company's George Parker A-1, in the same survey, a south offset to this earlier producer, with 10 feet of Gloyd saturated sand, was being tested at 6050 feet, and in the first 2 hours the well was opened Thursday it flowed 20 barrels per hour through ⅝-inch tubing choke with tubing pressure 150 pounds and casing pressure 600 pounds.

Across the line in Louisiana, Surf Oil Company made location for its third test in 8-23n-16w, northwest outpost, this being Pitts 1, center east 12 acres of a 24-acre lease in that section. Dr. S. C. Clark made location for Harris 1, SEc 4-23n-16w, on a 5-acre tract. In the north offshoot of the Louisiana side of the field, Standard Oil Company of Louisiana completed Armistead 3, Section 4-23n-16w, making 300 barrels daily at 6012 feet.

Shreveport.—Having already broken all depth records for North Louisiana or Arkansas, R. W. Norton's Payne 1, SE SE 27-23n-16w, Caddo Parish, south of the Rodessa Fault, last week continued drilling ahead at 10,334 feet, with operator's intention now being to drill to 12,000 feet.

Norton, who brought in the first gas-distillate well at Rodessa in August, 1930, had originally announced Payne 1 would go to 10,000 feet. The previous depth record for North Louisiana and Arkansas, was set several months ago by Gulf Oil Corporation's R. R. Rhymes 15, Section 32-17n-6e, Richland Parish, which went to 10,001 feet before abandonment.

The log of Norton's deep test has not been made known but the test is reported to have logged showings in the Travis Peak and in the lower Marine.

Across the line in Miller County, Arkansas, W. L. McClanahan's W. D. Capps 1, NE SW 11-20-28, logged 3 feet of lime said to have shown some saturation in what was identified as the Hill horizon at Rodessa at 5932-35 feet and was coring ahead for possible production in the Gloyd which is the productive horizon in Section 4-23n-16w, the north Rodessa offshoot. This test, with elevation of 284 feet, logged first anhydrite at 5270 feet, somewhat lower than the wells across the Louisiana line.

Farther north in Miller County, Standard of Louisiana spudded and was waiting on cement to set, with total depth of 1995 feet in Sarah Harvey 1, SW SW 33-16-25, on a geophysical prospect, contemplated as a 9000-foot test.

In the Marion County, Texas, offshoot of Rodessa, around The Hunter Company's recently completed E. W. Fonda 1, A. de los Santos Coy Survey, 8½ miles southwest of Rodessa production proper, 3 tests are drilling, 2 others were rigging up, and 2 new locations were made during the week, the latter being for additional tests by Fohs Oil Company and United Production Corporation, each of whom already has a test drilling there. All are on this survey.

EDWARD
6000 lb.
OWG VALVES
For dependable control of
HIGH PRESSURES

•

MAINTENANCE
ENGINEERING CORPORATION
3611 Clinton Drive Telephone P-3135
HOUSTON, TEXAS

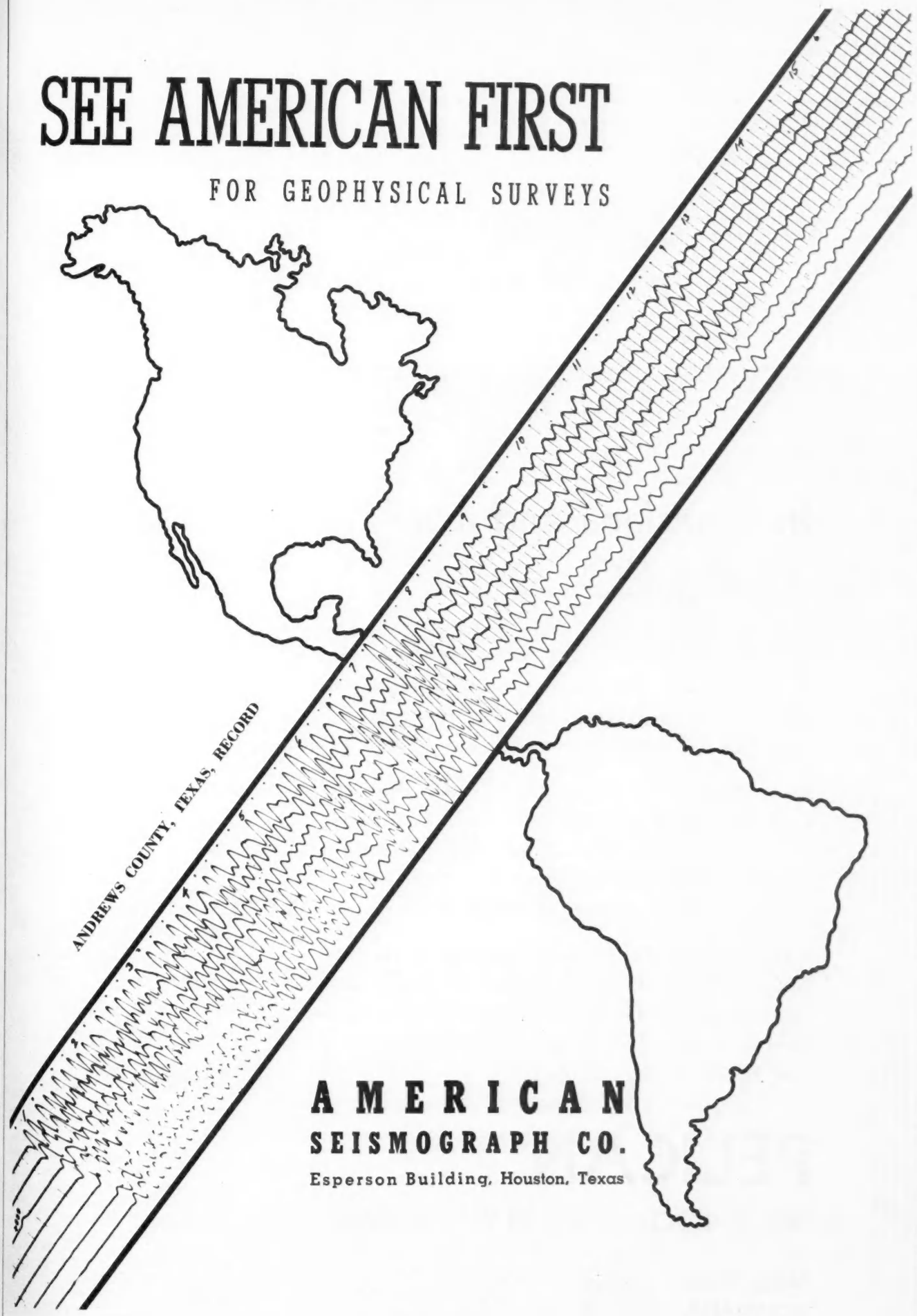
Specify this 6000 pound cold working pressure valve for use on your high pressure piping, on which you must depend to control the flow of high pressure gas and oil.

Sizes:
½" through 2"

Figure 158

SEE AMERICAN FIRST

FOR GEOPHYSICAL SURVEYS



AMERICAN
SEISMOGRAPH CO.
Esperson Building, Houston, Texas

Work increases on west side of Monroe Uplift

Shreveport.—North Louisiana Basin continues to feel the effects of the Schuler field, Union County, Arkansas, as leasing and exploratory work increase along the west side of the Monroe Uplift in the southeast-northwest trend.

Standard Oil Company, which is most strategically situated with large holdings in Union County, Arkansas, and Union Parish, Louisiana, has been adding to its acreage in Township 21 north, Ranges 2 and 3 west. Several other companies have been very active in that same area recently.

H. L. Hunt and Seaboard Oil Corporation's Good Pine Oil Company 1, Section 30-14n-5w, Bienville Parish, will go to 7500 feet under the provisions of a lease on 5000 acres of Bodcaw Lumber Company acreage taken recently by Hunt. This carried an agreement to drill one 7500-foot test immediately and if it failed to produce to start another within 60 days or forfeit the lease. Hunt and Seaboard together have over 13,000 acres.

Seaboard Oil Corporation is receiving bids for a second test in Beinville Parish, Bear Creek district, where it recently completed McGee 1, Section 3-16n-6w, as a large gas-distillate well.

Lide & Greer's W. J. Smelley 1, SE NE SW 18-16n-4w, Bienville Parish, newest Travis Peak gas-distillate producer at Driscoll, gauged 55,543,000 cubic feet of wet gas with a rock pressure of 2875 pounds. Depth is 7180 feet.

In Louisiana and Texas it's PELCO

IN EVERY PRODUCING AREA in the United States there is some one supply company in position to give its customers definite advantages.

In Louisiana and Texas it's PELCO. Since the first producing well was drilled in North Louisiana, the requirements of successful and thoroughly acclimated oil men have determined PELCO policies and inventories.

Highly desirable business has therefore gravitated to PELCO for more than 25 years, making it possible for PELCO to build service facilities and manufacturing affiliations unrivaled for the area where it operates.

PELICAN

WELL TOOL & SUPPLY COMPANY

SHREVEPORT, LOUISIANA

PELCO

Lake Charles—Houma—Converse
New Iberia—Rodessa—Monroe—Cotton
Valley—Turnertown—Greggton—Houston

Complete Cotton Valley's fifth distillate producer

Shreveport. — The fifth gas-distillate producer for the Bodcaw horizon of the lower Marine formation of the Cotton Valley field, Webster Parish, was completed last week in Woodley Petroleum Company's A. H. Gray B-4, Section 27-21n-10w, at 8444 feet. Seven-inch casing was cemented on bottom and perforated with 34 shots at 8094 to 8109 feet. It made 400 barrels of distillate and 4 million cubic feet of gas in a 24-hour gauge through ¼-inch tubing choke, with tubing pressure 2850 pounds and casing pressure, 2905 pounds.

Besides this well, two other Bodcaw horizon wells are being tested. Ohio Oil Company's A. H. Gray 1, Account 2, Section 26-21n-10w, perforated 7-inch casing cemented at 8409 feet, at 8060 feet and is testing. Total depth is 8439 feet. The same company is testing A. J. Hodges 2, Section 23-21n-10w, after perforating 7-inch casing cemented at 8476 feet. Total depth is 8517 feet.

Hunt Oil Company continues to lease around the flanks of the Cotton Valley field.

Revive Dixie Drilling

Shreveport. — The old Dixie field, Caddo Parish, which has been quiescent for the last seven years, will have a series of 6 tests drilled on a 400-acre lease, centering around Section 16-19n-14w, location for the first of the series having been made in that section last week by R. G. Trippett and the D.C.R. Oil Company, the latter having drilled the discovery well in that field in 1928.

On a block of approximately 4000 acres in DeSoto Parish, 4 miles north of the Holly field, Arthur D. Robinson of Dallas, Texas, has made location for Allison 1, C NW 17-14n-13w, for a 3000-foot test.

W. T. Parker Drilling Company of Houston, will start moving in materials soon for a 6000-foot test southwest of Converse, Sabine Parish, on a block of acreage centering around Section 27-9n-14w.

NORTH LOUISIANA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CADDO PARISH (Rodessa)—		
Standard of La., Armistead 3, 4-23n-16w	300	6012
CADDO PARISH (Pine Island)—		
Stanolind O&G Co., Wherritt 1, 23-21n-15w	46	1640
CLAIBORNE PARISH (Lisbon)—		
DeArman & McMillan, Maggie Patton A-2, 31-21n-4w	450	5313
H. E. Patton 2, 36-21n-5w	360	5257
Gulf, Eva Bennett 2, 31-21n-4w	600	5330
Love Pet. Co., H. E. Patton 2, 36-21n-5w	350	5306
Lyons & Neely, Maggie Patton B-1, 31-21n-4w	340	5279
Magnolia, H. E. Patton 1, 36-21n-5w	301	5336
S. M. English 1, 31-21n-4w	192	5298
P. W. Woodruff, T. E. Patton 1, 36-21n-5w	312	5303
DE SOTO PARISH—		
Rio Rojo Oil Co., Prudhomme 1, 20-12n-11w	50	2749
Chamberlin et al, Lanier 1, 29-11n-11w	*	3022
MOREHOUSE PARISH (Monroe)—		
United Gas, Crossett Lbr. Co. 46, 24-22n-4e	¶6½	2236

*Failures; †Junked; ¶Million cu. ft. gas.

Schuler shows potentially as important producer.

El Dorado, Ark.—The new Schuler field, which has 2 producing wells, both of which continue to yield consistently, had another important development last week to add to its impressiveness as the potentially most important field in Arkansas since Smackover.

During the last week, Lion Oil Refining Company's Edna Morgan B-1, NW SE 18-18-17, in a drill stem test at 5731 feet, with the testing tool open 6 minutes showed an estimated 25 million feet of gas daily and shot oil over top of the crown block. Made through ½-inch the well built 100 pounds pressure in 90 seconds and 450 pounds in 6 minutes. This is 172 feet below the producing level of Lion's Edna Morgan A-1, the discovery well and saturation with laminated shale strata existed from the horizon of the discovery well to this level, showing a great body of productive formation. Meanwhile the test is coring below 5750 feet for possible additional strata carrying oil.

A half-mile east of the two producing wells, Alice Sidney Oil Company's D. S. Morgan 1, in the same section, after drilling to 5735 feet, also showing deeper producing possibilities, has cemented casing. The deeper stratum was cored by Alice Sidney's well but was not tested. It showed for a producer at the discovery well's level.

Edna Morgan A-1, the discovery well continues to average 270 barrels of oil with about a half million feet of gas daily. Temperature of the oil is 76 with gravity of 43.7.

Marine Oil Company's M. Justiss 1, in the same section, north offset to the first well, continues to average 900 barrels daily. The temperature of its oil is 102 degrees and the gravity, 47.8.

Schuler field rules announced by board.

El Dorado, Ark.—The Arkansas Board of Conservation last week promulgated rules and regulations for the new Schuler field, Union County, Arkansas. Temporary regulations had previously been announced.

The permanent regulations require that 800 feet of surface pipe be set and production string shall be new casing set at sufficient depth to cut off all gas formations above the oil-saturated horizon.

Flowing wells shall be equipped and produce through tubing of not less than 2½ inches in diameter, with bottom of tubing not less than 20 feet above top of the producing horizon, and if the tubing is perforated, the perforations shall not extend over 20 feet above top of the horizon.

The order also included regulations for completing wells, installing tanks, separators and fittings.

No spacing regulations were adopted at the board's meeting, a spacing rule of 1 well to each 10 acres having been previously adopted. In special cases for a well on a smaller unit, special permit must be applied for, and if no objection is filed by the adjoining lease or land owner in a specified length of time, permit will be issued.

El Dorado. — Six drilling permits were authorized last week by the Arkansas Board of Conservation, including four for the newly opened Schuler district, Union County. The permits follow: Crittenden County — Stanley Oil Corporation, Denner Heirs 1, 100 feet south and 250 east center 18-8n-9e; St. Francis County—Manning and Martin, Incorporated, R. C. Gregg 1, 1650 south and 990 east NWc 20-5n-5e; Union County—Edwin M. Jones, Murphy Land Company 1, 330 feet south and east NWc NE NE 19-18-17; Lion Oil Refining Company, Edna Morgan B-2, 330 south and west NEc NW SE 18-18-17; Edna Morgan A-2, 330 south and east NWc Lot 1, SW 18-18-17; Marine Oil Company, Marine Oil Company 1, 330 south and east NWc SW SW 17-18-17.

El Dorado.—E. D. Holcomb and associates are reported negotiating with Superior Oil Company for part of its 4000-acre block in the northwest part of Township 18, Range 22, Columbia County, Arkansas, with a view to drilling a proposed 8000-foot test near Section 9-18-22.

SAVE TIME — *Specify* HOUSTON READY-CUT SECTIONAL HOUSES — SAVE MONEY

Homes, warehouses, tool houses . . . practically every type of building needed will be found in our catalogue.

All of these buildings are constructed to the high standards, which for almost twenty years have made Houston Ready-Cut (sectional) buildings the first choice of major companies and operators.

If our catalogue doesn't contain what you want, we will build it according to your specifications.

Quick erection, easy dismantling, high salvage value, positive portability, rigidity, long life are but a few of the time, money and labor saving advantages of Houston Ready-Cut House Company (Sectional) Buildings.

HOUSTON READY-CUT HOUSE CO.

Successors to CRAIN READY-CUT HOUSE CO.
HOUSTON, TEXAS

ARE YOUR GEOPHYSICAL DATA PERMANENT?

» Permanent data saves considerable time and money in field operations and eliminates errors which creep into non-permanent geophysical data.

» Data obtained with Askania Magnetometers and Torsion Balances are permanent because natural physical forces are accurately measured and the data secured can be checked at any time — this year or five years from now.

» This is not true of methods where to measure physical effects artificial means have to be used.

» Investigate the superiority of Askania Magnetometers and Torsion Balances for the securing of permanent, accurate geophysical data.

» A request will bring you complete information without obligation.

ASKANIA

AMERICAN ASKANIA CORPORATION

M & M BLDG. HOUSTON

NEW MEXICO

Three Monument outpost wells are producers.

* * *

Hole that required much packing is making oil.

* * *

Eunice lime area adds four wells during week.

Hobbs.—Three of the completions credited to the Monument field the past week were on outside locations. The Texas Company's Saunders 3, C NW SE 18-19s-37e, located on the northwest edge, flowed 292 barrels of oil on 5-hour gauge through ¾-inch choke, and made 50 barrels the last hour. The gas/oil ratio was 1318 feet per barrel. This well flowed natural, with the hole bottomed at 4010 feet, or 304 feet sub-sea.

Continental Oil Company's State 4-A-17, C NE SW 17-19s-37e, reported last week with initial flow of 147 barrels of 35 gravity oil per hour through casing with drill pipe in hole, has since been listed as a completion from lime at 3860-4004 feet, flowing 60 barrels per hour through ¾-inch tubing choke. It has an elevation of 3704 feet. Gulf Oil Corporation's State-Graham 2-G, an east offset, is a new location. The latter has also authorized the drilling of E. Shipp 1, C SE NW 21-19s-37e. Repollo Oil Company's W. P. Byrd 5, NW SW NW 11-20s-36e, located on southwest edge of production, flowed 347 barrels oil in 12 hours on ¾-inch choke at 3904 feet, or 314 feet sub-sea. Revival of drilling on the northwest flank of the structure may occur after the completion of Sun Oil Company's J. L. Barr 1, C SW SW 24-19s-36e. Formation tester used at 3770-3860 feet yielded 4,000,000 feet of gas, and 7-inch pipe has since been cemented at 3812 feet. Top of lime was logged at 2770 feet, or about 4 feet higher than the east offset. Amerada Petroleum Corporation's State 4-T, C NE NW 25-19s-36e, an inside location, is showing for a light producer, having tested one barrel per hour at 4055 feet, or 353 feet below sea level, and when treated with 2000 gallons of acid made 15 barrels in 8 hours and quit. It will be treated again.

Deepen Monument Well

Continental Oil Company's State 1-C-16, C SW NW 16-20s-37e, near southeast edge of production at Monument, deepened from 3809 feet, where it blew out April 15 and burned for one week, to 3830 feet, and flowed 44 barrels oil in 12 hours through 24/64-inch choke on tubing with packer at 3805 feet. The gas volume was rated at 2,780,000 feet daily, and may necessitate the lowering of the packer. This concern has started operations on Britt 6-B-18, C SE SE 18-20s-37e, and State 2-A-26, C NW SW, 26-19s-36e. Repollo Oil Company's Barber 7, NE SW NW 8-20s-37e, which earned a reputation of requiring almost a trainload of clay, mud, fibertex, cotton hulls, manufactured weighting compounds and cement to restore circulation at 3840 feet, tested 150 barrels oil in 12 hours through ¾-inch choke at 3880 feet, with gas volume rated at 7,000,000 feet daily. Crevice condition was overcome by cementing 7-inch pipe at 3205 feet. Another string of casing may be necessary to handle the gas.

The Texas Company et al's W. H.

NEW MEXICO Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
LEA COUNTY (Eaves)—		
Continental et al, J. S. Eaves 2-A-30, c ne nw 30-26s-37e	648	3220
LEA COUNTY (Eunice)—		
Gulf, State-Bell 2-E, c ne nw 11-21s-36e	2500	3850
State-Arnott-Ramsey 14-C, c ne sw 21-21s-36e	500	3890
Humble, State 1-G, c nw nw 23-21s-36e	50	3860
Ohio, State-McDonald 6, c se sw 16-22s-36e	2500	3850
LEA COUNTY (Hardy)—		
Gulf, E. A. King 2, c nw nw 28-21s-37e	60	3800
LEA COUNTY (Langlie)—		
Gulf, Geo. W. Shanan 1, c nw ne 33-25s-37e	1600	3280
Stanolind, P. J. Langlie 1-A, c sw sw 9-25s-37e	2000	3466
LEA COUNTY (Monument)—		
Continental, State 4-A-17, c ne sw 17-19s-37e	3600	4004
Phillips Pet. Co., Mexico-Britt 3, c se ne 18-20s-37e	3000	3850
Repollo Oil Co., W. P. Byrd 5, nw sw nw 11-20s-36e	1500	3904
The Texas Co., Saunders 3, c nw se 18-19s-37e	2500	4010
LEA COUNTY (Penrose)—		
Gulf, O. I. Boyd 1, c sw sw 23-22s-37e	150	3681
Humble, J. L. Greenwood 1, c se se 9-22s-37e	78	3767
LEA COUNTY (Skelly)—		
Skelly Oil Co., G. W. Sims 2, c ne ne 9-23s-37e	125	3713
R. R. Sims 4, c se sw 4-23s-37e..	110	3650
LEA COUNTY—		
Harry W. Leonard et al, Alice Siddall 1, c sw sw 6-20s-38e	*	4226

*Failures; †Junked; ¶Million cu. ft. gas.

Rhodes 2, SE NW SE 22-26s-37e, located a short distance southeast of the original oil and gas completion for southeastern Lea County, showed gas on drill stem test at 3000-3103 feet, and cemented 7-inch pipe at 3100 feet after drilling to 3160 feet, or 265 feet sub-sea. The same group's C. W. Shepherd 4-B, C SE 5-26s-37e, flowed 2½ barrels oil per hour through formation tester at 2893-3200 feet, with an elevation of 2989 feet. Five-inch pipe has been cemented at 2967 feet to complete. Continental Oil Company et al's Eaves 2-A-30 C NE NW 30-26s-37e, an inside location for the Eaves field, has been completed in lime at 3085-3220 feet, with an elevation of 2942 feet, flowing 45 barrels fluid per hour, 40 percent water, on gas lift. It was acidized at 3154-69 feet, then deepened.

Eunice lime area was credited with 4 of the 12 new locations reported in Lea County the past week. During this period there were 16 producers and a failure listed as completions. Gulf Oil Corporation has started work on White 6, C NW SE 25-20s-36e, and State-Bell-Ramsey 2-B, C SW SW 33-20s-37e. In the south end of the field, Ohio Oil Company has skidded rig for State-McDonald 7, C SW SE 16-22s-36e. Empire Oil & Refining Company's State 2-G, C SE SW 2-21s-36e, is a north offset to a recent completion by Gulf Oil Corporation.

Magnolia Petroleum Company's Hanna 1, C SE NE 7-26s-38e, southeastern Lea County wildcat, was in gray lime and anhydrite at 3140 feet, having topped lime at 2830 feet, or 194 feet above sea level. Continental Oil Company et al's Cline 1, C NE NW 15-23s-37e, located between the Skelly and Mattix area, was drilling at 2100 feet, with an elevation of 3293 feet. New test for the Skelly area involved Skelly Oil Company's B. F. Harrison 1-B, C NE NW 9-23s-37e, a south offset to a late completion by the company. In the Penrose area, N. G. Penrose and Rowan-Nichols Oil Company have made location for Walden 2, C NE NW 15-22s-37e.

Gulf Oil Corporation's E. A. King 2, C NW NW 28-21s-37e, was credited with making 12 percent water while flowing 70 barrels daily after acid and nitro shot at 3800 feet. Continental Oil Company et al's Wantz 1, north offset and a workover job, flows 17 barrels daily at 3872 feet. The latter's Burger 1, C NW SW 19-20s-37e, east offset to the northernmost producer in the Hardy area, flowed 1 barrel oil per hour for 12 hours when tested through casing with drill pipe in hole at 3874 feet, and location has been made for Lockhart 1-A-17, C NW SW 17-21s-37e, offsetting a 20-barrel producer. Gulf Oil Corporation is rigging up to drill McCormack 2, NW NW NE 32-21s-37e. The Texas Company's Ellen Weir 1, C NE NE 14-20s-37e, wildcat, was drilling hard lime at 4102 feet.

Shreveport.—Redditt and Gray were preparing to run 8-inch casing last week in Pickering Lumber Company 1, Stephen English Survey, Shelby County, Texas, 6 miles south of Joaquin, after an electrical tester was run to 4117 feet, after an oil and gas showing in the Paluxy. Mud had to be pumped into the well to prevent a blow-out after core was cut at 4117 feet.

Allred would remove state school lands from market

Austin.—Governor James V. Allred of Texas is seriously considering submitting to the special session of the Legislature the subject of creating a board to supervise the state's school lands, and to remove those lands from the market for a period. This subject, it was learned, may be submitted late next week.

All other state lands are regulated by a board, while school lands are handled by the land commissioner. A bill was introduced at the regular session to take these lands from the land commissioner, but did not get out of either house.

The governor feels that if the lands were withdrawn from the market the values of the minerals might be enhanced. Moreover, he believes the school fund should obtain more than the one-sixteenth mineral reservation which the law now provides.

His proposal would not include the abolition of vacancies, one of the principal controversies at the former session, nor the taking of venue in state land cases out of Travis County.

J. H. SULLIVAN, land man for The Texas Company in Wichita Falls and more recently in the Fort Worth district office for the past 14 years, has resigned to engage in the oil business as an independent.

Lives up to its name
GRIZZLY
"NO-WIP"
LINE SAVER
FLOATS WITH THE LINE
For complete description write for Bulletin No. 10-OF
Operators are finding that the Grizzly "No-Wip" Line Saver pays for itself over and over in reducing wire line wear to a minimum . . . in the elimination of many line difficulties, in the perfect spooling it makes possible.
With the Grizzly "No-Wip" Line Saver installed on your wire line there can be no friction, stress, strain, or metal-to-metal wear. The device floats with the line and the line itself runs between tough rubber rollers that spin freely at the slightest contact. This smooth, free, floating action also eliminates whipping, crawling, and overlapping . . . all without straightening or injuring the line. Built to boost drilling efficiency and safety, and to cut wire line replacement to the bone.
"A BEAR FOR WEAR"
E. M. SMITH COMPANY
600-650 South Clarence Street, Los Angeles, California
Warehouse: 2311 West Street, Houston, Texas
Export Office: Continental Emsco Co., 30 Rockefeller Plaza, New York City
DISTRIBUTED BY LEADING SUPPLY COMPANIES

ROCKY MOUNTAIN FIELDS

Lance Creek Minnelusa strike has good gas-oil ratio.

* * *

480-barrel Dakota sand well completed at Quealy.

* * *

Cut Bank and Kevin-Sunburst get extensions.

Casper, Wyo.—An excellent oil-gas ratio developed in the Ohio Oil Company's Leo 5-OPC-16, deep Minnelusa discovery well in Lance Creek, which gauged 76 barrels of oil per hour and 960 cubic feet of gas per barrel of oil. Production was developed at 5516-37 feet, with the hole bottomed in saturation.

Leo 5-OPC-16, NW NW SW 35-36n-65w, started originally as an east extension test to Sundance limits. It is three-quarters of a mile east and a quarter mile south of Continental Oil Company's Apex 2-Account 3, easternmost Sundance producer. Leo 5 developed water in the Sundance sand at 4275-97 feet, and while bringing in a new oil horizon limited another, the Sundance, indicating that the Minnelusa formation is productive over a greater area than the Sundance. Leo 5 also encountered water in the Upper Minnelusa at 4935-5515 feet.

Starts Drilling Campaign

Oil from the well tests 42 degrees gravity Baume scale, is paraffin base, and dark green in color. Following the discovery an immediate drilling campaign is under way in the field to the lower horizon.

Continental Oil Company's Tom Bell 10, C SW NW 34-36n-65w, midway between the Ohio's Leo well and Continental's Apex 2-Account 3, further reduced Sundance limits on the east when it developed water in the Basal Sundance at 4003-45 feet. It is drilling deeper at 4286 feet in the red beds, headed for the Minnelusa.

Two wells, drilling on the southwestern edge of the field developed water in the basal Sundance, defining limits. A. B. Cobb's Novick-Ong 2, SEc SW 6-35n-65w, had water in the Basal Sundance at 4096 feet, and is drilling deeper at 4380 feet. It will be an important definitive test to Minnelusa as it is situated four miles southwest of Leo 5. Novick 2 is a short 40-acre location south of same operator's Novick 1, a 500-barrel well. Mackinnie Oil & Drilling Company's Thompson 2, NEc NW 7-35n-65w, a south offset to Cobb's Novick 2, is shut down at 4064 feet in Sundance water, awaiting the outcome of deepening Novick 2 before drilling ahead for the Minnelusa.

Several Offsets Required

On the southeastern edge of the field beyond Sundance limits, Ohio Oil Company is moving in equipment to drill Taylor 32-OPC, NW NW SW 33-35n-65w, to the Minnelusa. The company is rigging up rotary for Leo 2-OPC 7, NE NE SE 35-36n-65w, an old producer to deepen to the Minnelusa and Leo 1-OPC 7, NWc NW SE 35-36n-65w. Both wells will require offsets to the north by Continental Oil Company, while the discovery well, Leo 5, requires

IXL
The Mark of Quality

NOTHING STOPS THEM!

•

Here is a line of oil well pumping units that has the rugged strength and stamina to stand up under the terrific shock loads encountered in oil well pumping.

Three-quarters of a century in gear engineering and manufacturing is behind it. This experience coupled with use of the finest materials has established IXL products as standards for comparison where the going is tough. The smooth, positive action of IXL oil well pumping units results from perfect rolling contact over the entire tooth surface. That's precision! Gears of high carbon steel heat treated and hardened, extra-heavy base, self-aligning roller bearings and automatic controlled lubrication are other outstanding features that mean long life. These advantages are built into both the single and double reduction units. The IXL data book gives complete information for selecting the proper drive for any job. Send for it.

IXL Helical Speed Reducers

Warehousing Distributors: FRICK-REID SUPPLY CORP., Tulsa, Okla., REPUBLIC SUPPLY CORP. OF CALIF., Los Angeles, Calif. Supply Houses: Atlas Supply Co., Muskogee, Okla.; International Supply Co., Tulsa, Okla.; Jarecki Mfg. Co., St. Louis, Mo.; Texas Steel Co., Fort Worth, Texas; United Iron Works, Pittsburg, Kansas; Steel Products Co., Iola, Kansas.

FOOTE BROS.
GEAR & MACHINE CORPORATION
5309 S. Western Boulevard - Chicago

Direct Factory Representatives: GEO. J. FIX, 2413 Commerce St., Dallas, Texas. T. C. GRAHAM, P. O. Box 596, Overton, Texas. MAX E. LANDRY, 533 Mayo Bldg., Tulsa, Okla.

Continental offsets on Buck Creek Oil Company acreage to the west and north.

Sundance limits on the northwest side of the field appeared fairly well defined this week as Argo Oil Corporation's Ford 3, SW NW 33-36n-65w, pumped 25 barrels of oil and 200 barrels of water from 4045 feet attempting to back away from Sundance bottom hole water. Argo's Ford 4, SW SE 33-36n-65w, a 40-acre location south of No. 3, is waiting on a rig

In the Quealy field, Albany County, The California Company's Wilson 3, SW NW SW 18-17n-76w, completed this week for 480 barrels initial from the Dakota sand 3401-3511 feet. The well completed selectively, setting 7-inch production string at 3871 feet just above the Sundance sand from 3878-3936 feet and perforated in the Dakota. Depth is 4010 feet, elevation, 7470 feet. California's Holst-Woolf 1, NW NW NW 19-17n-76w, is a near completion running production string to the top of the Sundance after making an electrical porosity test. Total depth is 4067 feet.

McAlpine Development Company, headed by John Lang, Charleston, West Virginia, coal operator, announced plans this week for a drilling campaign to develop light oil production on 4000 acres held in two fault block tracts on the south end of Garland field. Though principally a black oil producer from the Madison lime at around 4000 feet, light oil was first developed on the high of Garland anticline in the Frontier series. McAlpine plans to drill the holdings on the theory that depletion of the light oil reserve on the crest of the structure, did not affect the fault block reservoirs, which are sealed off by stratographic displacement.

In Powder Wash field, Moffat County, northwestern Colorado, Mountain Fuel Supply Company's J. C. Donnell 1, NE SE 31-12n-97w, is at critical depth, drilling at 5275 feet. The well apparently is checking considerably lower than the two producing oil wells in the field and has failed to top any oil saturation, although it has encountered several gas flows.

In Utah, Mountain Fuel Supply Company's E. S. Lauzer 1, NW NW 27-3n-24e, Clay Basin gas structure, Daggett County, is drilling at 4160 feet.

Two Montana Extensions

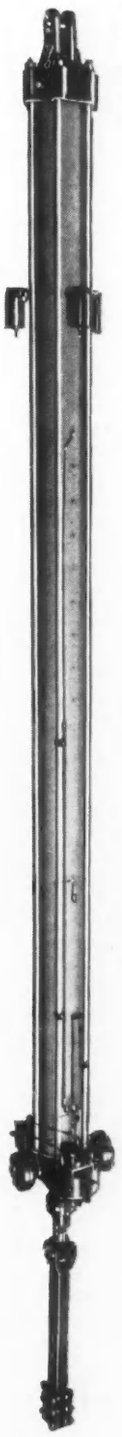
Two important extension tests were drilled into oil production in both the Cut Bank and Kevin-Sunburst fields of northern Montana. Glacier Production Company's O'Brien 1, NW SW 32-34n-5w, along the gas-oil line separating the oil sector of Cut Bank from where the stratigraphic trap structure noses up eastward to form the gas trap, flowed 250 barrels initial from the Cut Bank sand at 2728-49 feet. The Texas Company's Fee 3-Unit 9, C SE SW 9-32n-5w, in the southern part of the field, swabbed 155 barrels initial from 2975-3005 feet in the Cut Bank. Annand-Hutchins' Federal Land Bank 2, NE SE SW 11-34n-6w, swabbed 85 barrels in the first 24 hours logging the Cut Bank sand at 2850-89 feet.

Kevin-Sunburst production was brought almost to town limits for Kevin as Platt & Bell's Roseth 1, SE SE NE 35-35n-3w, flowed 25 barrels natural of 34 degree gravity oil from 1526 feet. It extends the field a mile and half south and is four miles west and three miles east of the nearest production. The well is expected to add about 3000 acres of land to the Kevin field for immediate testing.

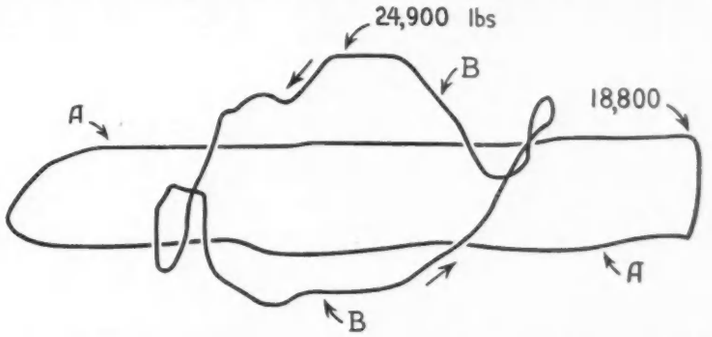
MOUNTAIN STATES
Completions

Company, Well and Location	Init. Prod. Bbls	Depth
MONTANA		
GLACIER COUNTY (Cut Bank Field)—		
Cut Bank Oil Trust Co., Yunck 1, se se se 23-34n-6w	12	2946
Santa Rita Oil & Gas Co., Rasmussen 1, cse sw 32-33n-5w	200	2946
TOOLE COUNTY (Kevin-Sunburst Field)—		
A. Beardslee's Swears 6, nw ne se 9-35n-2w	10	1649
E. C. Carney, Stockman's Nat'l Bank 1, se ne 11-35n-2w	10	1577
J. W. Perrin, Haugen 1, sw ne nw 11-35n-3w	170	1845
S. F. Scotland, McNamer 1, cne sw 29-35n-3w	11	1760
Watson et al, Leach 2, ne ne ne 31-35n-3w	15	1796
WYOMING		
CARBON COUNTY (Rock River Field)—		
Ohio Oil Co., Diamond Cattle Co. 6, nw nw 35-20n-78w	*	3340
NIOBRARA COUNTY (Lance Creek Field)—		
Ohio Oil Co., Carrie Putnam 2, nec sw nw 5-35n-65w	672	4096
Leo 5 OPC-16, nw nw sw 35-36n-65w	1800	5537

*Failures; †Junked; ¶Million cu. ft. gas.



SULLIVAN PUMPHEADS ARE EASIER ON SUCKER RODS—THEY ABSORB SHOCKS



(A) Sullivan Pumphead card taken at 11½-132 inch s.p.m. Tapered string of rods, 6427 feet long, consisting of 2400 ft. of ⅞" and 4027 ft. of ¾". With 1¾" plunger, well produced at the rate of 476 bbl. per day, 38° oil, no water. Apparent volumetric efficiency 87.9 per cent.

(B) Walking Beam card taken at 16.8-74 inch s.p.m. Tapered string of rods, 6410 feet long, consisting of 2410 ft. of ⅞" and 4000 ft. of ¾". With 1¾" plunger, well produced at rate of 370 bbl. per day, 38° oil, no water. Apparent volumetric efficiency 83.4 per cent.

THE peak of card B, so characteristic of the walking beam, does not appear in card A, which is typical of the Sullivan Pumphead. This is due to the shock-absorber effect of the Sullivan Pumphead.

The stresses in the top sucker rods, in pounds per square inch, are 41,450 for the walking beam, compared to 31,300 for the Sullivan Pumphead. A reduction of 24.5 per cent. It is not strange, therefore, that the relative frequency of sucker rod jobs is three per *year* for the Sullivan Pumphead against three per *month* for the walking beam. A potential saving of $3,300.00 per year at $100.00 per job!

An article, "The Sucker-rod Pump as a Problem in Elasticity," contains information of interest to users of sucker rods. Send for your copy today.

SULLIVAN MACHINERY COMPANY
1914 COMMERCE ST. DALLAS, TEXAS

Representatives: **Denver:** 1815 California St., Phone Keystone 6334; **El Paso:** 117 No. Kansas St., Phone Main 757; **Los Angeles:** 2900 Santa Fe Ave., Phone Kimball 5137; **New York:** 30 Church St., Phone Courtland 7-6545; **Oklahoma City:** 532 N. W. Eubanks St., Phone 5-9026; **Tulsa:** 321 Wright Bldg., Phone 3-2250; **Alvin, Texas:** P. O. Box 453, Phone 97;
Executive Offices: **Chicago, Illinois**

SULLIVAN PUMPHEADS

CALIFORNIA FIELDS

Ten Section test sets new depth record for state.

* * *

Tests indicate spotted condition in El Segundo.

Los Angeles. — Cheated out of a world's record for depth by a drill stem which stuck recently at 12,618 feet, just 168 feet shy of the existing record, Superior Oil Company and Union Oil Company's joint test in the Ten Section area nevertheless set a new record for depth in California.

The drill pipe was recovered to 11,197 feet. Then 460 feet of 4¾-inch blank liner was landed on top of a plug at 11,198 feet. The zone behind this liner will be gun perforated and tested by stages. It is doubtful if commercial production will result from the tests to be made.

Last casing set in this deep test was 7-inch, cemented at 10,380 feet. Sticking the drill pipe at the extreme depth was the only major trouble experienced and the drilling operations had been rather routine.

Kettleman Test Below 10,587 Feet

Another deep test in California causing much interest is Kettleman North Dome Association's No. 4-18J, which was drilling at 10,587 feet in shale at last reports. This test, Section 18-21-17, is an outpost.

Other deep tests in California are either fishing or testing. In Kern County, Arkelo Petroleum Company's No. 41, Section 23-28-26, is still fishing for drill pipe with bottom at 10,056 feet. At Dominguez in Los Angeles Basin, Union Oil Company's Callender 50, with bottom at 10,435 feet, is bailing and swabbing, without much result. It is understood that Shell Oil Company will attempt to carry one of its present tests to an extreme depth in this same field.

At Santa Fe Springs, Union Oil Company's Bell 100, with bottom at 10,789 feet, continues fishing for drill pipe. It is understood this deep test had several interesting showings higher up.

El Segundo Spotted

Wells at the new El Segundo field in Los Angeles County now testing indicate the field is very spotted. Standard Oil Company's Refinery 1, with bottom at 7079 feet, ran a formation tester to 7052 feet and recovered 350 feet of fluid, the upper 75 feet being gas cut oily mud, the next 230 feet, live oil, 27.5 gravity, and the bottom 45 feet, gas cut oily mud. The hole is to be tested again. Richfield Oil Company's Santa Fe 1, with bottom at 7640 feet, would not flow and pumping equipment is being installed. The Texas Company's Johnson 2-2, bottomed at 7750 feet, refused to flow and its Security 2, bottom at 7265 feet, has cemented 8⅝-inch at 7181 feet, and is testing the shut off. Only six wells are drilling in the field.

Wilmington Busy

Twelve new completions and 16 new locations is the past week's record at Wilmington. Union Pacific Railway Company carried away the honors with two completions good for 2365 barrels of clean oil, gravity ranging from 26.1 to 27.1, highest of any wells so far completed in the new field. Also the two wells were deepest so far drilled, one stopping at 3915 feet and the other going to 3860 feet. Most of the new wells produce around 18 gravity oil, depths ranging from 3050 feet to about 3600 feet. Long Beach has called an election to decide upon throwing open to drilling certain lands within the city limits, and it is generally expected drilling will be permitted.

Test Near Oxnard Looks Good

One wildcat in Ventura County that is attracting unusual interest is El Rio Oils-Canada's No. 1, Section 6-1-21, which is now being tested at 2999 feet for production, with good chances of proving a new field in the area near Oxnard. Last casing was 8⅝-inch, cemented at 2624 feet. The formation tester recovered muddy water and some oil. Liner and tubing was run and well started to flow heavy mud and a little oil. It flowed for nine hours. Liner and tubing is being pulled and mud will be bailed out and hole cleaned out to bottom before another production is attempted. The well is in the center of a 425-acre lease, and the concern has other land in the general area under lease. The Texas Company has some land nearby and other California operators are well protected with fairly large leases.

Thomas Kelly & Sons' Anaheim U. W. 1, Section 24-3-10, may extend East Coyote field in Los Angeles Basin. This hole bottomed at 3723 feet, with 8⅝-inch cemented at 2530 feet, has been on a pumping test for several days and has been pumping water with a trace of oil. Effort is being made to locate water. This test cored some likely looking oil sand and scouts feel it will be a producer if the water problem can be solved.

With a northeast extension of the

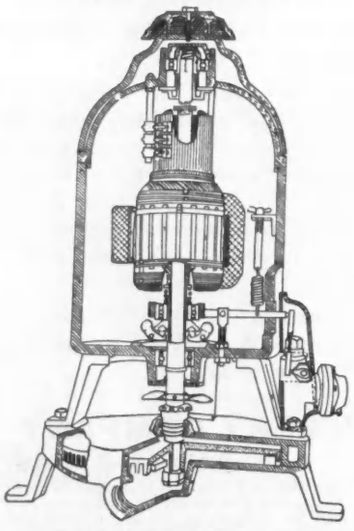
CALIFORNIA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
KETTLEMAN HILLS—		
Kettleman North Dome Assn., No. 56-28J	2400	8145
KERN FRONT—		
Calif. Star Oil Co., No. 8-40	150	2630
Republic Pet. Co., Cal Tech 1	285	1936
McKITTRICK—		
East Puente Oil Co., Lease 2, No. 11	40	1330
Franco Western Oil Co., No. 13	250	2280
McVAN—		
Hobee Oil Co., McVan 1	17	1216
MIDWAY SUNSET—		
Hugh B. Evans, No. 16	170	2315
Honolulu Oil Corp., No. 52	35	3415
Standard, No. 126-33D	850	3097
ADAM—		
Hancock & Bush Oil Co., Bradley 1	2500	5157
PIRU—		
Pacific Western, Temescal 8	200	2907
FRUITVALE—		
Western Gulf, Brockman 1	*	6989
SAN LUIS OBISPO COUNTY—		
Gretna Corp., Miano 1	*	1585
I. L. Burch, No. 1	*	3209
SHIELLS CANYON—		
Petroleum Sec. Co., Home Ranch 5	*	4525
SANTA BARBARA COUNTY—		
Cohn & Mitchell, Giacomiani 1	*	4251
PLAYA DEL REY—		
Metropolitan Oil Co., No. 1	*	6500
DOMINGUEZ—		
Union Oil Co., Callender 52	185	6764
Union Oil Co., Hellman 46	565	5290
PLAYA DEL REY—		
Union Oil Co., Del Rey 17	125	6001
WILMINGTON—		
Bankline Oil Co., Terminal 29	250	3418
Terminal 32	360	3350
Watson 7-2	300	3513
General Pet. Corp., Patten 3	170	3618
Terminal 3	795	3550
A. T. Jergins Trust No. 7	450	3461
Midland Pet. Co., Midland 5	360	3700
Pacific Western, Wilmington Com. 1	240	3050
Packard Pet. Corp., No. 20-8-1	200	3596
Wilmington 3	300	3610
Union Pacific Ry. Co., Offset 11	825	3915
Offset 15	1540	3860

*Failures; †Junked; ¶Million cu. ft. gas.

YOU CAN'T FORGET!

TO OIL THIS GENERATOR



FROST OILLESS VERTICAL

Manufactured By

R-F ELECTRICAL MANUFACTURING CO.

SHAWNEE, OKLA., U. S. A.

Edison field in Kern County as the objective, Golden Bear Oil Company has leased the Cohn property and will drill a test 330 feet south and 230 feet east from west quarter corner in Section 12-30-29. This wildcat hopes to prove new area for production.

Italo Petroleum Corporation feels sure that deep production can be developed in the northwest part of the old Kern River field, in Kern County, and location for Koshland 1 has been staked 200 feet north and 200 feet west of south quarter of Section 19-28-28.

In the Adam area in Santa Barbara County, Hancock Oil Company-Bush's joint test, Bradley 1, Section 26-10-34, was completed for 3500 barrels of 16 gravity oil at 5157 feet, with 8⅝-inch cemented at 4085 feet. It was cleaned out to bottom, liner and tubing was run, and it was swabbed onto production at 2500 barrel rate, later increasing to 3500 barrels.

In the Rio Vista gas field in Solano County, Amerada Petroleum Corporation's Marks 1, Section 24-4-2, with bottom at 4550 feet, tested good for a potential of 43,000,000 cubic feet of gas and is shut in. This hole cemented 7-inch at 4135 feet.

Wildcatting Continues

In spite of the fact that California is producing from 60,000 to 70,000 barrels of oil a day over the fixed allowable, the larger companies and more important independents are seeking new fields in wildcat territory and drilling for deeper zones in the older fields. Apparently they feel there will be a shortage of oil in the next two or three years and are seeking new supplies. The tests drilled below 10,000 feet seemingly have quite a little trouble. Mostly, they stick the drill pipe.

Much of the over production is coming from Wilmington, but this drilling program will pinch out in another 60 to 90 days. It is easy drilling at Wilmington and wells are completed in short order. Available locations are being drilled fast. Most of the older fields are producing about all the oil possible without damaging their old producers.

New Structure Indicated

In the Flood Control area in Los Angeles County, between Long Beach and Dominguez, Hilldon Oil Company's No. 1, Section 11-4-13, is pumping 250 barrels of 19 gravity oil, cutting from 8 to 10 percent. This hole at one time made 125 barrels of oil and some water. It was killed and drilled to 6105 feet and then plugged back to 5750 feet. A string of 5¾-inch casing was cemented at 5663 feet and perforated from 5410 to 5435 feet. This particular area has been looked upon with some favor for some months, and the completion of this well indicates a new structure, but it is doubted if it is very large or that the new field will be of very much importance.

In the Adam area of Santa Barbara County, Union Oil Company's Vincent 3, Section 30-10-33, was completed at 4227 feet June 6 for 3000 barrels of 15.1 gravity clean oil. The 6⅝-inch liner was perforated at three points. Reports indicate it is possible the well can establish a potential of 5000 barrels. It is flowing through 1-inch choke, with 170 pounds on the tubing and 390 pounds on the casing.

Bond County, Illinois, wildcat makes 300 barrels.

* * *

Indiana lease play increasing at rapid pace.

Pittsburgh.—With completion of a Bond County wildcat as a 300-barrel producer and an important extension to the Bartelso pool of Clinton County, Illinois continues to hold Eastern Fields' interest.

A. T. Whitehead brought in the Bond County well on the Carol Poland tract, NW SE SW Section 26-6n-2w, Mulberry Grove Township. The sand was topped at 1300 feet and 300-barrel production obtained following a shot. Elevation is 560 feet.

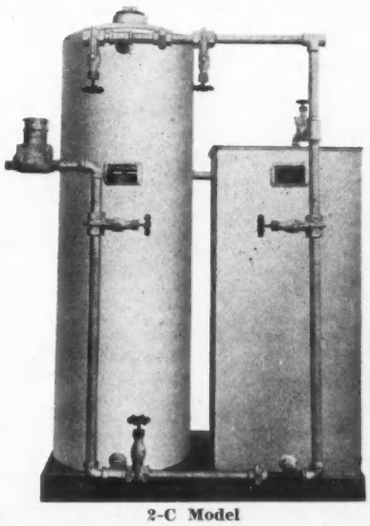
Santa Fe Oil & Gas Company extended the Bartelso pool with H. Robbin 1, SE SW SE Section 5-1n-3w, Santa Fe Township. The location is north of the Vandeloo lease, where there are several producers.

There is no let-up in the feverish leasing activity in the Basin field. The Wiser Oil Company was reported as having paid $185,000 for an oil and gas lease on the 840-acre Damon Smith farm, a quarter of a mile north of Pure Oil Company's Bunny Travis 1. A drilling rig is to be moved in this week. The Travis well is slowly dropping from its initial production of 2500 barrels daily as the gas pressure decreases. It was brought in three weeks ago. Production was in the neighborhood of 1500 barrels daily as the past week closed, with a further drop to between 500 and 1000 barrels expected.

Rapid progress is being made at Pure Oil Company's Sarah M. Bechtel 1, located 600 feet west of the Travis well. Drilling below 2540 feet, the McCloskey producing sand is expected in another 500 feet. The Travis well was bottomed at 2960 feet. This company has drilled E. C. Brach 1 in the Cisne field of Wayne County through the first layer of oil bearing sand, and was in limestone at a depth of 3030 feet. A second pay sand is expected soon which can be shot for production. In this same field, the company's Stella Billington 1 was swabbed out. Cave-ins at both locations retarded completion, but Pure Oil officials expect both to be good producers when finally completed.

Ohio Oil Company announced plans to drill the first oil well in Richland

Plenty of SOFT WATER for All Oil Field Purposes



2-C Model

With The ROYAL H. P. ZEOLITE WATER SOFTENER

(THE ORIGINAL)

The Royal Portable H.P. Zeolite Water Softener delivers Zero Hardness water where you need it in the oil country. Removes all scale forming chemicals from feed water and prevents corrosion. For use on Leases, Production, Pipe Line Engines and Boilers.

Built in nine sizes, based on amount of steam pressure and water necessary to take care of boilers in use. Models built up to 350-pound Working Pressure. Royal Zeolite mineral capable of base-exchanging 5500 grains of calcium per cubic foot of mineral. Eight to twelve hours per regeneration.

We solicit your business on any water treating problems for drilling, refining, natural gasoline and power plant operations.

Write for Complete Information

ROYAL MFG. CO., Box 693, Tulsa, Okla.

County during the current boom, to be started within three or four weeks on the Charles Palmer farm, 1 mile northwest of Noble. Equipment was being moved in last week.

Four fair producers and 3 commercial gas wells are among 11 recent Indiana completions. While not as active as the Basin area of Illinois, the play in Indiana fields is increasing at a rapid pace. In Pike County, where Murphy Oil Company brought in a 15-barrel producer on the Roscoe Cox lease from the shallow Shawhan sand, representatives of several Texas and Oklahoma companies are active in leasing activities and are planning deep tests. Geophysical work has been done in the vicinity of Spurgeon and Stendal, as well as in adjoining Knox and Gibson counties where leasing activity has also been great.

Kentucky Quiet

There were no outstanding developments in Kentucky fields. Completions included 9 producers, averaging 18 barrels daily, 1 small gas well, and 4 failures. All completions were shallow.

The 35-barrel producer of Preston Oil Company on the Sunday Creek Coal Company lease, listed as No. 1634, was the largest of five Ohio producers. Located in Coal County, Perry Township, it was bottomed at 3695 feet in the Clinton sand and attained its 35-barrel daily production after a shot. In this same county, Pure Oil Company has a 10-barrel producer on the Clarence T. Miller farm, Clayton Township, which was bottomed in the Clinton sand at 3190 feet.

One completion was recorded in the Oriskany deep sand gas field of Kanawha County. The Columbian Carbon Company bottomed its test on the Mary Boggess farm, Poca District, at 4887 feet, where it gauged 11,300,000 cubic feet of gas a day.

While failures, in proportion to completions, in other West Virginia fields were at an unusually low point, the week saw no outstanding developments. Of the 24 completions, 6 were producers with production averaging 3½ barrels a day, 17 were gas wells and 1 was a failure.

EASTERN FIELDS
Completions

Company, Well and Location	Init. Prod. Bbls	Depth
WEST VIRGINIA		
BOONE COUNTY—		
Owens Illinois Glass Co., Allen & Pryor 21	¶¼	2086
A. J. Ballard 1	¶	2120
Cassingham Coal Land Co. 26	¶	2556
BRAXTON COUNTY—		
West Virginia Gas Co., G. B. Howell 7604	¶2/5	1818
G. B. Howell 7601	¶1/5	1464
E. G. Dunlap 1	¶1/5	1602
Lewis Bennett 4	¶	1620
CABEL COUNTY—		
Kentucky West Virginia Gas Co., N. B. Morrison 1	¶¼	3410
W. C. Kingery et al, Sarah E. Midkiff	¶	1890
CALHOUN COUNTY—		
Lyle S. Ayers et al, H. G. Brannon 1	¶1 4/5	2251
GILMER COUNTY—		
Decker Drilling Co., Mary Jane Bush 1	5	1440
KANAWHA COUNTY—		
Columbia Carbon Co., Mary Boggess 1	¶12	4887
Owens Illinois Glass Co., Siler Coal Land Co.	¶4/5	4012
Cambridge Gas Co., Garnet Wiseman 11	¶1¼	3645
LINCOLN COUNTY—		
Summerson & Swanson, J. A. Thompson 1	¶1¼	3342
RITCHIE COUNTY—		
West Turn Oil Co., A. J. Glass Heirs 5	1½	1938
Mahaney & Lucas, J. F. & Laura Kelley	*	1967
Frank Finley, Lester Moore 1	¶1/3	2120
Mud Lick Oil & Gas Co., Alfred Collins 3	¶	2237
TYLER COUNTY—		
Gale Oil Co., Sarah Thistle 19	9	1349
C. W. Edgar, John F. Eastham 1	1	1920
WAYNE COUNTY—		
Kentucky-West Virginia Gas Co., Ben Blankenship 1	¶1½	3220
WETZEL COUNTY—		
Carnegie Natural Gas Co., Z. T. Stewart 1506	3	2920
Hope Natural Gas Co., Wm. Shaffer 7774	¶2 1/3	1950
WOOD COUNTY—		
Royal Craig, Asa & Mary Ingram	1	1375
INDIANA		
DUBOIS COUNTY—		
A. B. Bement, Hugh Bockman 2	*	1198
GIBSON COUNTY—		
Victor C. Besing, Geo. B. Beresford 1	*	1350
KNOX COUNTY—		
Glengarry & Lord, Emmett Blann 1	¶	....
Bruce Cloud, W. Evans 4	¶	....
Lloyd & Parker, Maude Wolfe 1	¶	600
MARTIN COUNTY—		
J. E. McKee, R. F. Lyons 1	*	285
PIKE COUNTY—		
Murphy Oil Co., Roscoe Cox 1	15	960
SULLIVAN COUNTY—		
Wyman & Brown, Joe Thomas 6	40	....
VANDERBURG COUNTY—		
Jornbrook & Baertich, Wm. G. Bachle 1	40	1243
VIGO COUNTY—		
Keller Development Co., B. E. Beard 1	*	1890
Siosi Oil Corp., Wm. Riggs 24	40	....
KENTUCKY		
DAVIESS COUNTY—		
O. D. Vickers et al, Eli Carter 4	25	558
ESTILL COUNTY—		
Claude Townsend, Dan Miller 2	5	380
South Penn Oil Co., J. M. Garrett 48	7	822
Petroleum Exploration Co., Sam Tipton 4	2	310
HANCOCK COUNTY—		
J. C. Ellis, Link Edwards 14	*	544
W. E. Hupp, Matt Young 1	15	....
O. D. Vickers et al, Mrs. M. O. Brown 3	10	549
I. C. Stephens 5	25	587
Mitchell Huff 3	15	564
OHIO COUNTY—		
Clark & Snyder, W. E. Hedden 1	*	463
A. Ford et al, R. P. Ralph	*	....
Interstate Oil & Gas Co., J. G. Withers	*	398
A. Brunnell 4	¶	590
Cane Run Petroleum Co., C. J. Rhoades 17	50	....
ILLINOIS		
BOND COUNTY—		
A. T. Whitehead, Carol Poland 1	300	1320
CLINTON COUNTY—		
Santa Fe Oil & Gas Co., H. Robbin 1	150	....
MARION COUNTY—		
Adams Louisiana Oil Co., Merryman 4	30	1422
Merryman 5	60	1415
OHIO		
KNOX COUNTY—		
Preston Oil Co., Lloyd Bailey 1	10	3176
MONROE COUNTY—		
Bentz Oil Co., Cline & Howell 3	*	1650
MORGAN COUNTY—		
W. T. Bowman et al, C. C. & Adam Thompson	4	449
NOBLE COUNTY—		
L. A. Patton, Geo. Warren 10	1	964
PERRY COUNTY—		
Preston Oil Co., Sunday Creek Coal Co. 1634	35	3695
Pure Oil Co., Clarence T. Miller 1	10	3190
Wiser Oil Co., J. McQuaid	¶¼	860
WASHINGTON COUNTY—		
F. M. Russell et al, Joseph Lorentz 2	*	685
PENNSYLVANIA		
GREENE COUNTY—		
Charles Mong et al, J. L. Metz 1	8	3313
Manufacturers Light & Heat Co., Ward Chambers 1	¶	3057
Equitable Gas Co., George Craig 1	*	3178

*Failures; †Junked; ¶Million cu. ft. gas.

MICHIGAN FIELDS

Michigan has busy week with 14 completions

Mount Pleasant.—Fourteen completions in Michigan for the week included 12 oil wells, a gas well and 1 failure. The latter was a semi-wildcat test in southeastern Michigan and was abandoned above the Trenton lime, the formation which has showed some commercial production around 2500-2600 feet in the area.

Eight of the week's completions were in Buckeye and Billings Townships of Gladwin County.

Gordon Oil Company's Parker 1, NW NW NE, 29-12n-9w, Montcalm County, initialed 25 barrels in Monroe lime at 3335 feet for the second commercial pumper in the new Winfield Township district. It is a south offset to Daily Crude Oil Company's Weatherby 1, completed last winter for a small pumper. A west offset was a failure.

Thirty-eight permits issued the current week, one of the two largest issues ever made in Michigan, call for continued Buckeye-Gladwin County area development and brings Sun Oil Company, the principal active major in the play, into increased activity. Sun alone took out permits for 11 new starts.

The week failed to develop any important relief in the Buckeye field proration situation. The Buckeye producers' committee announced a new cut. Present requirements call for a 100-barrel base and a 5 percent overage up to pipe line requirements.

Operators in fact do not anticipate any relief or change in the situation immediately. Greater withdrawal alone can come when markets in or out of state are developed to take the available production.

MICHIGAN
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
GLADWIN COUNTY—		
Bell & Marks' Wineman 1, nw sw nw, 9-17n-1e	35	3619
Mammoth Prod. & Ref.'s Ockerman 3, se se nw, 11-18n-1w	2160	3633
State B2, nw se se, 11-18n-1w	900	3634
State B3, se se se, 11-18n-1w	590	3637
Smith Pet.'s Reed 2, se se ne, 11-18n-1w	550	3631
Franklin Pet.'s State A2, se nw ne, 11-18n-1w	265	3639
Rex Oil Co.'s State A2, nw ne se, 11-18n-1w	1890	3633
C. L. Maguire, Inc.'s Haven 2, se sw sw, 25-18n-1w	30	3620
ISABELLA COUNTY—		
Pure Oil, Embrey 2, se se se, 33-15n-6w	150	3538
Latham 4, n½ w½ sw se 35-15n-6w	600	3644
LENAWEE COUNTY—		
Mich Pacific's Busey 1, ne se se, 25-6s-5e	*	1250
MONTCALM COUNTY—		
Wolverine Gas Co.'s Richardson 2, c ne se 3-12n-7w	¶7½	1304
Gordon Oil Co.'s Parker 1, nw nw ne 29-12n-9w	25	3335
OGEMAW COUNTY—		
Dunnigan & Fotergill's Smith 1, ne se. 19-22n-2e	60	2777

*Failures; †Junked; ¶Million cu. ft. gas.

IMPORTANT WILDCAT TESTS

ARKANSAS

ASHLEY COUNTY—Joe Modisett & Phillips Pet. Co.'s Stillions 1, s½ sw nw 18-17-9, rog.

CLEVELAND COUNTY — Texas-Canadian Dev. Co.'s I. E. Moore Est. 1, ne ne 22-9-10, spd dr 952 ft.

COLUMBIA COUNTY—Robt. Keen's Runyon 1, 1-16-21, dk.

DALLAS COUNTY—J. C. Voyles et al's Sorrells 1, se se sw 35-10-16, dr 990 ft.

HEMPSTEAD COUNTY—Easton, May & Murdock's LaGrone 1, ne ne 5-12-26, woc 12½ in csg 131 ft. E. H. Moore, Inc.'s Porterfield 1, ne se 21-14-25, elev 346 ft, chalk 1275-1650 ft, top anhydrite 3128 ft, coring 3543 ft.

HOWARD COUNTY—Boetcher O&G Co.'s State Life 1, nw nw 28-11-27, dk and mir.

LAFAYETTE COUNTY—Nivla Oil Corp.'s DeLay 1, nw sw se 19-15-24, sd 1470 ft.

LINCOLN COUNTY—Fitzwater et al's V. Bowens 1, nw sw ne 26-9-6, spd woc 10-in csg 20 ft.

LITTLE RIVER COUNTY—J. G. Strahan's Dierks 1, 21-12-28, top red beds 1130 ft, top anhydrite 1804 ft, so 2349-54 ft, arr test, td 2354 ft.

LONOKE COUNTY—Frank Silver's Chambers 2, 17-2n-7w, sd 1025 ft.

MILLER COUNTY—W. L. McClanahan's Capps 1, ne sw 11-20-28, elev 284 ft, chalk 2040-2552 ft, top first anhydrite 5270 ft, core 5940-58 ft. E. H. Moore, Inc.'s Dale 2, c e½ 24-15-26, elev 250 ft, top Young 4320 ft, top Travis Peak 4654 ft, cemtd 8⅝ in csg 5655 ft, td 5678 ft (to drill to Big Lime). Standard of La.'s Harvey 1, sw sw sw 33-16-25, spd dr 1680 ft (9000 ft test).

NEVADA COUNTY—Benedum & Trees Oil Co.'s Grove 1, se nw 10-14-20, sw 4277-4317 ft, core 5005 ft. Bruce Wallace's Wm. Haynie 3, se nw 6-14-20, woc 105 ft.

OUACHITA COUNTY — Copenhaver Oil Corp.'s J. E. Evans 1, nw ne sw 20-11-19, rur. H. H. Taylor's Joe McCree 1, sd 2705 ft.

UNION COUNTY—Alice Sidney Oil Co.'s 18-18-17, woc 7-in csg 5731 ft, td 5735 ft; Morgan 2 and 3, lcns; Powledge 1, sw se 7-18-17, spd woc surf csg. Lion's Edna Morgan B-1, 18-18-17, coring 5747 ft; Edna Morgan B-2, dk and mir. Marine Oil Co.'s M. Justiss 2, sw se ne 18-18-17, mim. Edward M. Jones' Murphy Land Co. 1, ne ne 18-18-17, rur. W. D. Wingfield's Southern Kraft Corp. 1, 18-16-14, elev 124 ft, top Blossom 2619 ft, coring 2992 ft.

CALIFORNIA

KERN COUNTY

DEVIL'S DEN—Amerada Pet. Corp.'s Beer 4, 17-26-19, dr shale 1920 ft. Den Pet. Co.'s Bates 1, 20-25-19, in shale streaks oil sand, 4276 ft, fsh slip. Geo. Goodrum's Baron 1, 24-25-18, sd 320 ft. Lube Oil Co.'s Gordon 1, 2-25-18, sd 4280 ft.

LERDO—Arkelo Pet. Co.'s No. 41, 23-28-26, td 10,056 ft, fsh dr pipe.

CARRISA PLAINS—Anchor Oil Co.'s No. 1, 31-31-22, grading roads.

BENA—Bacal Oil Co.'s No. 1, 5-30-30, dr sand and shale 456 ft. Cajolco Pet. Co.'s No. 1, 9-30-30, dr shale 2423 ft.

PREMIER—Bojaki Oil Co.'s Bowen 1, 28-27-27, sd 1959 ft. General Pet. Corp.'s Umbsen 1, 36-27-26m, lcn.

GRAPEVINE—Buffalo Oil Co.'s Tejon 1, 5-10-19, sd 4452 ft. Hall-Baker Co.'s No. 11-1, 14-10-19, spud 5/29, dr. Ohio Oil Co.'s Title Ins. D1, 21-11-19, dr shale 8863 ft. Reserve Oil & Gas Co.'s Ritchie 33-1, 33-11-19, td 6030 ft, plug 4990 ft, sd; Tejon 33-2, 33-11-19, td 4505 ft, redr to 4476 ft, sd; No. 33-3, td 4431 ft, shut in; No. 33-4, td 4570 ft, top oil sand 4544 ft, wocs 8⅝ in at 4540 ft.

ROUND MOUNTAIN—California Western's Durnal 1, 4-28-29, rur. Patton-Baldwin Oil Co.'s No. 1, 32-28-29, dr shale 500 ft.

KERN FRONT—C. C. M. Oil Co.'s Carter 1, 7-27-27, td 2362 ft, r. Seskayden Oil Co.'s No. 3A, 17-28-27, td 2890 ft, co.

WASCO—Continental Oil Co.'s K.C.L. A-1, 8-27-24, sd 9591 ft, will drop from report; No. 2, rig. Seaboard Oil-Tide Water Associated's K.C.L. C-1, 26-27-24, td 9159 ft, wocs 7 in at 9148 ft.

JASMINE—Doyle Pet. Corp.'s Quinn 1, 15-25-27, td 2956 ft, plug 2882 ft, bailing.

EDISON—East Edison Oil Co.'s No. 1, 23-30-30, dr shale 1273 ft. Golden Bear Oil Co.'s Cohn 1, 12-30-29, rig.

ELK HILLS—Elk Hills Pet. Co.'s No. 1, 14-31-28, sd 7580 ft.

NORTH KERN RIVER—Hub Oil Co.'s No. 1, 8-28-28, sd 3320 ft.

KERN RIVER—Italo Pet. Corp.'s Koshland 1, 19-28-28, lcn. Ray Luse's No. 1, 10-28-28, lcn.

STRAND—Ohio Oil Co.'s K.C.L. E-2, 6-30-26, dr shale 7446 ft.

TEN SECTION—Shell's Canal-21, No. 14, 14-30-25, td 8490 ft, ran formation tester, no oil. Superior Oil Co.-Union Oil Co.'s K. C. L. 8, 11-30-26, td 12,618 ft, stuck dr pipe, recovered to 11,198 ft, ran 460 ft 4¾ in blank liner, landed 11,198 ft, to gun perforate and test.

FRUITVALE—Shell's K.C.L. A-36, 31-29-27, rur.

WEST MOUNTAIN VIEW — Sunset Oil Co.'s Sunset-Starr 1, 17-30-28, dr shale 6625 ft, top Santa Margarita about 6540 ft.

McGUNDEN — Superior Oil-Jergins Trust's Crome Com. 2, 36-29-28, rur.

SAN EMIDIO—Union Oil Co.'s No. C3, 33-11-22, dr shale 3174 ft.

RIO BRAVO—Union Oil Co.'s Kernco 1-34, 34-28-25, dr brown shale 8606 ft.

MIDWAY SUNSET—Valley Oil Co.'s No. 1, 18-32-23, td 3170 ft, plug 2780 ft, to test.

BAKERSFIELD—Wilshire Oil Co.'s F&P 1, 36-29-27, dr shale 4710 ft.

MISCELLANEOUS

HUMBOLDT COUNTY—Texas Co.'s Eureka 2, 22-3-1, td 7708 ft, milling.

KINGS COUNTY — Birch-Royer Oil Co.'s Wm. Orr 1, 5-23-17, rur. Ray Bisconer's No. 1, 11-24-20, lcn. Central Calif. Utilities' Kettleman-Lakeview 3, 11-23-19, td 1202 ft, plug 1190 ft, sd. Dudley Ridge Dev. Co.'s No. 2, 24-23-20, dr shale 310 ft. Kettleman View Oil & Gas Co.'s No. 1, 9-22-19, sd 4787 ft. Glen C. Stone's Teeter 1, 25-20-20, sd 1040 ft. Tri-Counties Oil Co.'s Olson 1, 10-23-22, td 4300 ft, perforated 7 in, 3800 to 4050 ft, bailed, no recovery, to reperforate.

SAN BENITO COUNTY—Tide Water Associated's Murphy Ranch 1, 5-12-4, td 6921 ft, plug 4860 ft, set plugs twice, perforated, and only got water.

SAN JOAQUIN COUNTY — Standard's Woods Com. 1, 24-1-5, dr shale 4381 ft. Texas Co. Lawrence-Stephens 1, 8-1-6, foundation.

SOLANO COUNTY — Amerada Pet. Co.'s Marks 1, 24-4-2, td 4450 ft, flowed 43,000,000 cu ft gas, shut in; Marks 2, dr shale 4442 ft.

SONOMA COUNTY—Stone & Youngberg's No. 1, near Petaluma, 29-5-8, lcn.

STANISLAUS COUNTY — Coast Explor. Co.'s No. K2, 30-4-9, td 3002 ft, to test sand at 2780 ft.

SUTTER COUNTY—Buttes Oilfields' No. 4, 2-15-1, td 5800 ft, fsh dr pipe.

TULARE COUNTY—E. P. Jennings' No. 1, 4-24-23, td 2707 ft, plug 2309 ft, waiting; No. 2, 33-23-23, rig.

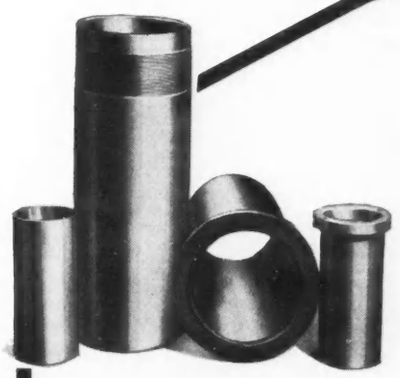
MONTEREY COUNTY—Amil A. Anderson's No. 1, 15-24-14, dr hard sand 1093 ft. Shell's No. 1, 34-24-10, td 8994 ft, co to 8810 ft, to plug and test; Branch 2, td 8662 ft, plug 8045 ft, sd, did not abn.

SAN LUIS OBISPO COUNTY — Aviation

ABBREVIATIONS

The following abbreviations, signs, etc., are used in completions and wildcat reports in THE OIL WEEKLY.

*—*dry hole abandoned well.*
‡—*salt water (completions).*
†—*junked and abandoned.*
¶—*million feet of gas.*
abd—*abandoned.*
bbls—*barrels.*
br—*building rig.*
b.s.—*basic sediment.*
csg—*casing.*
co—*cleaning out.*
dd—*drilling deeper.*
dk—*derrick.*
dr—*drilling.*
fsg—*fishing.*
ft—*feet.*
hfw—*hole full of water.*
in—*inches.*
lcn—*location.*
m—*milling.*
mim—*moving in materials.*
mit—*moving in tools.*
mot—*milling on tools.*
n, s, e, w—*north, south, east, west.*
oih—*oil in hole.*
owdd—*old well drilling deeper.*
owpb—*old well plugging back.*
pb—*plugged back or plugging back.*
r—*reaming.*
rog—*rig on the ground.*
rur—*rigging up rotary tools.*
rust—*rigging up standard tools.*
sd—*shut down.*
sdtr—*sidetracking.*
sg—*show gas.*
si—*shut in.*
so—*show oil.*
so&g—*show oil and gas.*
spd—*spudding.*
sr—*straight reaming.*
sw—*salt water.*
td—*total depth.*
ur—*underreaming.*
wih—*water in the hole.*
wo—*workover.*
wocs—*waiting on cement to set.*
wosr—*waiting on standard rig.*



80% of Boulder Dam cement grouting passed through

CALMEC

Hardened Steel

PUMP LINERS

which are identical with the liners we supply for slush pumps. As a result of their performance at Boulder Dam, Calmec Pump Liners are now specified by the U. S. Bureau of Reclamation for all cement grouting.

What we have done for them, we can do for you. Our engineering and metallurgical services are always available. Tell us your requirements and send us your drawing, or old liner, for duplication. We always carry a complete stock of hardened and ground steel liners for slush pumps.

CALMEC MANUFACTURING CO., Ltd.

5817 Riverside Drive Los Angeles, California

OIL FIELD CALMEC EQUIPMENT

Oil Co.'s Britnall 1, 10-11-35, sd 1930 ft. I. L. Burch's No. 1, 3-10-26, td 3209 ft, abn. Burkholder Oil Corp.'s Clay 1, 14-10-26, sd 3252 ft. Gretna Corp.'s Miano 1, 25-30-10, td 1585 ft, top Franciscan 1570 ft, abn. A. O. Lewis' Pecho 1, 34-30-10, dr shale 2746 ft. Pismo Pet. Co.'s No. 1, 5-32-13, sd 4425 ft, to drop from report. Temblor Oil Co.'s No. 1, 22-31-21, dr shale and gray sand, good cut, 1714 ft. Oscar Willeet's No. 1, 27-26-13, dr shale 300 ft.

SANTA BARBARA COUNTY—E. C. Arnold's Arnold-Apache 2, 8-8-33, dr shale and sand 4000 ft. Cohn & Mitchell's Giacomiani 1, 18-10-34, td 4251 ft, top Franciscan 4246 ft, no Monterey present, to abn. Hancock Oil Co.'s Los Alamos 2, 6-7-32, dr shale 800 ft. Leora Oil Co.'s Fithian 1, 8-4-25, sd 1025 ft. Mid-Western Oil Co.'s N1. L1, 28-4-27, td 2054 ft, set 8⅝-in at 1980 ft. Murdock & Allen's No. 1, 16-7-30, material. Pacific Western Oil Co.'s Hobbs 1, 21-10-34, dr shale 1000 ft. S. E. D. Oil Co.'s No. 1, 27-10-34, dr shale 1010 ft. Tide Water Associated's No. 1, 3-6-33, rig. Union Oil Co.'s Russell 1, 21-10-34, dr Monterey shale 4368 ft. Valley Oil Co.'s Chief 1, 20-9-34, td 2315 ft, on pump, sanded up, co.

SANTA CRUZ COUNTY—Elba Oil Co.'s Elba 1, 6-12-1, rig.

VENTURA COUNTY—Continental Oil Co.'s Casitas 1, 7-3-23, Red Mountain area, dr hard sandstone 7725 ft. El Rio Oils-Canada's El Rio 1, 6-1-21, td 3000 ft, cemented 8⅝-in at 2624 ft, ran formation tester, recovered muddy water, trace of oil. Speik Oil Co.'s Speik 1, 35-5-19, dr shale 2510 ft. Giovanni Vai's Scott 1, 4-4-21, dr shale 250 ft.

SOUTHERN CALIFORNIA

NEWHALL—Barnsdall's Rancho San Francisco 1, 26-4-17, td 6472 ft, pumping 175 bbls 36.8 gravity clean oil; No. 2, rig. Holbrook Pet. Co.'s Newhall Land 1, 28-4-16, td 5365 ft, twisted off dr pipe, top pipe at 4865 ft, plug 4830 ft, to redr.

PICO CANYON—A. G. Burt's No. 1, 36-4-17, dr hard shale 1623 ft.

LYNWOOD—Galizoo Oil Co.'s Saulque 1, 9-3-13, dr sand and shale 5118 ft.

NORTH LONG BEACH—Geo. L. Clayton's Clayton 1, 32-3-12, sd 4895 ft.

FOX HILLS—Country Club Oil Co.'s No. 1, 19-2-14, sd 3020 ft.

HERMOSA BEACH—C. M. Henderson's No. 1, td 2804 ft, recovered and cemented 8⅝-in at 2800 ft, testing shut off.

DAVIDSON CITY—Hilldon Oil Co.'s Flood Control 1, 11-4-13, td 6105 ft, plug 5750 ft, bailing and testing casing.

WALNUT—Julian & Criswell's Langstaff 1, 5-2-9, td 1805 ft. redr at 1520 ft.

PALOS VERDES HILLS—McClaren Bros.' No. 1, 27-4-14, td 3970 ft, redr to 1870 ft, bridge at 1100 ft, dr out bridge.

MONTEREY PARK — Wales Pet. Co.'s Hogue 1, 26-1-11, spud 5/30 dr.

ORANGE COUNTY—Wm. Alexander's No. 1, 22-3-9, foundation. Mesa Oil Co.'s Mesa 1, 29-6-10, dr hard shale 7647 ft. Richfield Consolidated Oil Co.'s Todd 1, 22-3-9, dr shale 1158 ft. Signet Oil Co.'s Signet 1, 21-3-9, dr sand and shale 1483 ft. West American Oil Co.'s Irvine 1, 14-5-9, near Tustin, dr hard sand 4203 ft.

KANSAS

BARBER COUNTY—Pryor & Lockhart's Gant 1, cse/4 7-31s-13w, circ 2950 ft. Barbara Oil Co.'s Holmes 1-27, cnw nw 27-33s-13w, dr 2540 ft. Colonial Oil Co.'s J. W. Blunk Estate 1, ne ne ne 13-24s-14w, mim. W. I. Southern, Inc.'s Davis 3, se se ne 24-24s-15w, rot rig.

BARTON COUNTY—Stanolind O&G Co.'s Struder 1, se se sw 26-16s-13w, td 3412 ft; 1000 ft oih, 5 hrs. Republic Nat. Gas Co. & Continental's Moeder 1, ne ne sw 25-17s-13w, set 10-in csg 2173 ft. Stanolind & I. T. I. O. Co.'s Natl Bank 1, se se sw 36-16s-13w, lcn. Sam Murphy's Beck 1, ne ne ne 17-17s-12w, rig. Hanna's Luce 1, sw sw sw 21-20s-13w, rur. S. E. Bailey's Hammeke 1, ne ne sw 12-18s-12w, co 2190 ft. Shell Pet. Corp.'s Schneider 1, cse/4 12-16s-14w, set 7-in csg 660 ft, woc.

BUTLER COUNTY — Vickers Pet. Co.'s Voth 1, cnl s/2 sw ne 32-24s-4e, dr 3257 ft. Simpson Oil Co. et al's Dennis 1-A, ne ne sw 15-26s-6e, fsg 915 ft. Maurer & Saco Oil Co.'s Connell 1, ne ne sw 27-29s-5e, ru.

CHASE COUNTY—Propp et al's Fromm 1, se se se 29-18s-9e, dr 2735 ft.

CHATAUQUA COUNTY—E. I. Shaffer's Nuckalls 1, nw nw nw 12-33s-9e, td 2540 ft, D&A. Robinson et al's Foster 1, sw sw sw 6-33s-12e, sd 1725 ft. C. L. Brosius et al's Garrett 1, nw sw nw 26-32s-11e, sd. Buffington & Cohen's Hayes 1-A, se ne se 10-33s-13e, so&g 1617 ft; ur 6-in csg. Ira Scott et al's Lambe 1, sw nw ne 18-33s-13e, abd 2006 ft.

COWLEY COUNTY—Ryan Consolidated's Couch 1, sw sw se 13-30s-5e, testing. Elmer Ash et al's Bolack 1, nw nw se 22-32s-6e, dr 3260 ft. Murta & Wilson's Turner 1, ne ne nw 30-32s-6e, testing. Blair, Continental & McKnab's Miller 1, ne nw sw 14-32s-5e, dr 1700 ft. McCoy, Amerada & Wentz' Anderson 1, se nw ne 34-34s-6e, set 10-in csg 1755 ft. Tom Palmer et al's Ogroskey 1, se se nw 31-32s-5e, dr 2006 ft. Trees Oil Co.'s Hornbeck 1, nw nw nw 5-33s-4e, dr 360 ft.

EDWARDS COUNTY—Royal Pet. Co. et al's Krupp 1, nw nw se 18-24s-19w, dr 5024 ft.

ELK COUNTY—Republic Nat. Gas Co.'s Glasscock 1, se ne sw 19-31s-11e, dr 745 ft. G. T. Berry's Zimmerman 1, sw ne se 15-30s-10e, set 8-in csg 1356 ft, dr 1410 ft.

ELLIS COUNTY—Empire's Samuelson 1, ne ne ne 31-11s-16w, woc. Mazda Oil Co.'s Henderson 1, sw sw ne 27-11s-18w, sdo 3583 ft. Noble Pet. Corp.'s O'Laughlin 1, nw nw se 13-12s-19w, td 3943 ft, D&A. Bridgeport Mach. et al's Froelick 1, nw nw se 4-13s-16w, rebldg rig. Twin Drlg. Co. et al's Craig 1, ne ne se 6-11s-16w, td 3610 ft, D&A. Billings' Smith 1, se se nw 14-12s-16w, dr 2915 ft. Earl Wakefield et al's Burnett 1, nw nw ne 1-11s-18w, ru. Austin Drlg. Co.'s Karlin 1, nw nw nw 13-12s-18w, rig. Winkler & Koch's Jensen 1, sw sw ne 3-13s-18w, mit rot, sd. Muth's Penney 1, nw nw ne se 29-14s-18w, dr 315 ft.

ELLSWORTH COUNTY — Orville Lee's Larkin 1, nw nw nw 15-16s-8w, dr 2830 ft. Frost et al's Dolechek 1, ne ne sw 36-14s-8w, td 3515 ft, D&A.

GREENWOOD COUNTY—B & B Co.'s Webb 1, cne se 3-26s-13e, td 1440 ft, D&A. Ward McGinnis et al's Hanley Estate 1, sw sw sw 25-25s-9e, run 5-in csg. Western Kan. O&R Co.'s Taylor 1, se se sw 6-27s-12e, sd 100 ft.

HAMILTON COUNTY—Barnsdall Oil Co. et al's Porter 1, sw sw ne 30-25s-41w, dr 3236 ft.

HARPER COUNTY—Carter Oil Co. et al's Seibert Estate 1, csw nw 4-34s-8w, td 4670 ft, A/w 2000 gals, bailed 65 gals wtr and 5 gals oil.

HARVEY COUNTY—Simpson & Noble et al's Pierce 1, sw se ne 25-22s-2w, dr 1260 ft. Shaffer et al's Epp 1, se se sw 15-23s-3w, rot rig. Hollow & Bradley's Nevfeldt 1, ne se nw 17-22s-1w, dr 2950 ft.

KEARNEY COUNTY — J. L. Murphy's Masonic Home 1, cnw/4 1-26s-36w, dr 500 ft.

LOGAN COUNTY—Rosespring Drlg. Co. et al's Wright 1, cse se 12-15s-35w, td 4910 ft, D&A.

MAKE THE "Popping off" AROUND YOUR RIG

A PAYING PROPOSITION

Every time a SHEAR-RELIEF Valve pops some pump owner makes a profit. Popping of this valve means the loss of a nail only . . . the sheared nail which releases the valve piston, and thereby the excess pump pressure which otherwise would have meant destruction or, at least, damage to the fluid end or to costly pump parts. Thus, the SHEAR-RELIEF Valve actually means money in your pocket every time it pops . . . and they're popping to the profit of pump owners in oil fields everywhere.

Full details in your COMPOSITE CATALOG or in literature, mailed upon request.

The high pressure type, for slush pumps. A low pressure type serves boiler feed pumps or similar low pressure service.

FLUID-PISTON HIGH PRESSURE SLUSH PUMPS
ABERCROMBIE PUMP CO.
GULF BLDG. HOUSTON TEX.

SHEAR-RELIEF VALVE

MARION COUNTY—Western Kan. O&R et al's Suderman 1, se sw nw 22-20s-2e, cel.

McPHERSON COUNTY — Bradley Bros.' Barnholt 1, sw sw se 30-20s-5w, dr 2896 ft. Smith et al's Larson 1, nw nw sw 35-18s-5w, dr 2260 ft. C. E. Ash Drlg. Co.'s Broman 1, ne ne nw 19-17s-4w, ru. Fred C. Frank et al's Doles 1, se nw ne 12-19s-1w, fsg 1045 ft. Wamhoff et al's Nuse 1, se se sw 18-18s-4w, dr 672 ft.

MITCHELL COUNTY—Geo. Seidhoff et al's Greiss 1, sw sw se 16-8s-10w, ur 6-in csg 3275 ft.

NESS COUNTY—Newton Dev. Co.'s Tenny 1, nw nw se 19-18s-25w, sd 4379 ft. Jones & Lane's Page Milling Co. 1, se se nw 36-18s-26w, rig. Patton & Paul's Lank 1, se se sw 35-18s-21w, lcn abd.

PRATT COUNTY — Atlantic, Empire & Skelly's Runyon 1, sw nw ne 11-27s-13w, dr 2010 ft.

RENO COUNTY—Clyde Pulse et al's Payne 1, sw nw ne 4-22s-7w, co to 3287 ft. Imo O&G Co. et al's Watkins 1, se se se 14-22s-7w, dr 1700 ft. Carter, Continental & Empire's Bontrager 1, C-54, ce/2 ne ne 26-24s-5w, rot rig.

RICE COUNTY—L. E. Douglas' Coyne 1, ne se se 24-21s-8w, dr 3525 ft. John Hanna et al's Fulton 1, nw nw ne 24-19s-6w, dr 3500 ft. Fred Phillips et al's Hubenett 1, sw ne sw 23-20s-8w, set 8-in csg 3204 ft, co. Union O&R Co. et al's Baker 1, sw sw ne 33-20s-6w, co 3465 ft. Comanche Oil Co.'s Cramm 1, sw sw se 15-19s-9w, dr 2735 ft. Hipple et al's Wernett 1, ne ne nw 11-20s-6w, dr 2552 ft. Stanolind O&G Co.'s Mooney 1, ne ne sw 5-19s-10w, cor 3081 ft. Skiles et al's Helmer 1, nw nw ne 7-19s-8w, dr 2285 ft. Witt et al's Fair 1, ne se se 4-22s-8w, dr 2125 ft. Skiles et al's Campbell 1, se se ne 28-19s-9w, mim. H. V. Holland et al's Brothers 1, se se se 12-21s-7w, br. Buckley's Bailey 1, sw sw nw 19-20s-6w, temp abn.

ROOKS COUNTY—Lester & Dean's Burtt 1, se se ne 29-10s-20w, fsg 3818 ft. Jones Bros. Drlg. Co.'s Wiss 1, nw nw nw 8-10s-8w, dr 3741 ft. Brunson Drlg. Co. et al's Casey 1, se se ne 22-9s-16w, dr 2930 ft. C. R. Craft et al's Ziegler 1, ne ne sw 8-10s-16w, set 8-in csg 2860 ft, rust. S. C. Hoel et al's Ives 1, sw sw ne 11-7s-18w, dr 1365 ft. W. W. Kiskadden et al's Ham 1, sw sw nw 25-7s-19w, mim. Graham et al's Fike 1, sw sw nw 9-9s-17w, fsg 3304 ft.

RUSH COUNTY—S. A. Murphy et al's Roth 1, nw nw sw 21-16s-18w, dr by 2635 ft. Duee & Brouk's Lebsack 1, se se ne 13-16s-16w, dr 2650 ft. Westgate-Greenland Oil Co. et al's Greenwalt 1, nw nw ne 19-19s-16w, rust. Carter Oil Co. et al's Prosch 1, cel n/2 se 21-18s-16w, dr 1580 ft.

RUSSELL COUNTY—S. A. Murphy et al's Deines 1, se se sw 36-15s-15w, ur 6-in csg 3164 ft. Goldstein & Vernon O&G Co.'s Steinert Estate 1, ne se sw 34-15s-15w, dr 2465 ft. Aylward et al's Jones 1, se se nw 22-14s-13w, dr 2855 ft. Equity Gas Co.'s Harbaugh 1, nw ne sw 19-13s-12w, td 3098 ft, D&A.

SCOTT COUNTY—Olson Drlg. Co. et al's Nolan 1, nw nw ne 13-19s-33w, fsg 4777 ft.

SEDGWICK COUNTY — Cameron et al's Smith 1, sw se se 13-27s-2e, pb 2388 ft, D&A. Roxanna Drlg. Co. et al's Woodman 1, sw nw sw 26-26s-1w, sd 2469 ft. E. B. Shawver's Furman 1, sw ne se 24-29s-3w, dr 1302 ft. Union O&R et al's Howell 1, sw sw sw 6-29s-1e, mim.

STAFFORD COUNTY—W. P. Faulkner's Schulz 1, se se ne 6-22s-13w, ru. Rosespring Drlg. Co. et al's Gray 1, nw nw nw 11-24s-13w, woc 285 ft. Atlantic's Kachelman 1, se nw nw 13-25s-14w, dr 1122 ft.

SUMNER COUNTY—Graham et al's Dawson 1, nw nw nw 4-23s-2w, fsg 4255 ft. The Texas Co.'s Harper 1, ne sw se 9-30s-3w, ur 6-in csg 4385 ft. Glimac Oil Co. et al's Proud 1, sw se se 33-30s-1w, rust 3632 ft. W. M. McKnab's Blair 1, sw sw sw 7-30s-1e, rig.

TREGO COUNTY—W. I. Southern's Latimer 1, nw nw se 19-15s-22w, set 8-in csg 3725 ft, rust. Turner et al's Rogers 1, csw/4 3-15s-23w, rot rig.

WOODSON COUNTY—Morris et al's Koening 1, se se nw 35-24s-15e, dr 400 ft.

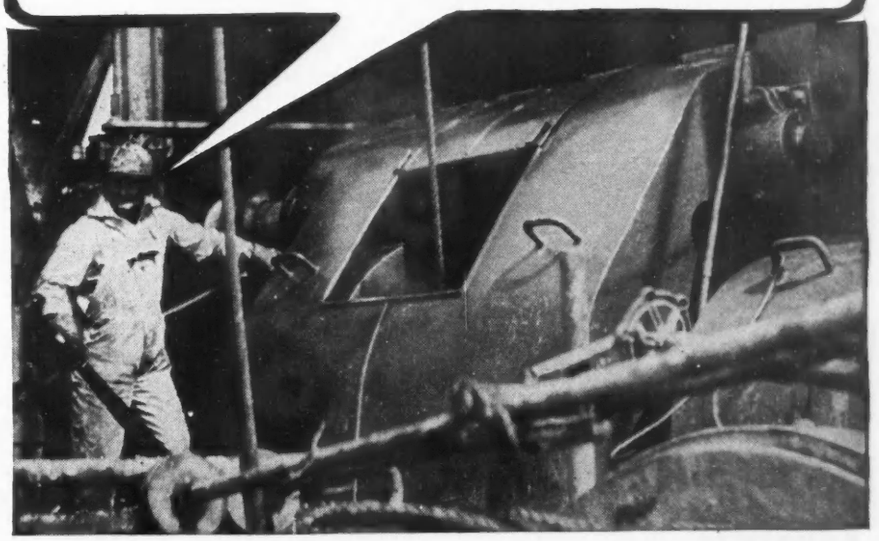
NORTH LOUISIANA

BIENVILLE PARISH—DeSoto O&G Co.'s Wm. Ashley 1, sw se 15-16n-10w, 10¾ in csg 2100 ft, dr 3884 ft; Wm. Ashley 2, 15-16n-10w, lcn. Hunt & Seaboard's Good Pine 1, c se se 30-14n-5w, top chalk 2377 ft, top Blossom 2822 ft, dr 3775 ft. Lide & Greer's W. J. Smelley 1, se ne sw 18-16n-4w, elev 231 ft, 7-in csg 7093 ft, gauged 55,543,000 cubic feet wet gas with 2875 pounds rock pressure, td 7180 ft. (Travis Peak). Davis Lbr. Co. 2, w½ w½ ne 12-16n-5w, mim.

CADDO PARISH—W. J. Hunter's N. B. Stoer 1, 10-15n-15w, arr set csg on bottom and perf at 5200-5300 ft, to test sg, td 6018 ft. R. W. Norton's Payne 1, se se 27-23n-16w, coring 10,277 ft (may go to 12,000 ft). Prairie River Oil Co.'s Hutchinson 1, 15-15n-12, sdtr, td 7787 ft. Fallon Oil Co.'s Cupples 1, 24-16n-13w, running 5¾ in csg, td 5675 ft.

CLAIBORNE PARISH—J. R. Bevill et al's

HERE'S A LINING THAT CAN STAND THE GAFF!



TOM SINGLER operating one of the largest and best drilling rigs in the Corpus Christi oil fields, owned by W. A. Richardson Petroleum & Drilling Corp., and equipped with J-M Giant Rotary Lining, Style 410. Both owner and driller are sold on the superior, longer service of this rugged brake lining.

Here's why J-M Lining, Style 410 is the choice on so many Drilling Rigs:

AN EVEN FEED-OFF
. . . assuring better controlled drilling.

LESS SMOKING AND DUSTING
. . . working conditions greatly improved.

SCORING TENDENCY REDUCED
. . . life of brake rim is lengthened.

QUIETER BRAKES
. . . less nerve strain on drilling crews.

Johns-Manville
GIANT ROTARY LINING
Style 410
JM

WRITE NOW—for full details on our complete line of friction materials. Address Johns-Manville, 22 East 40th Street, New York City.

University of Texas
OIL AND GAS LEASES

In Crane, Ector, Andrews, Upton, Crockett and Pecos counties offered at public auction June 25, 1937, at the Highway Building Hearing Room, Austin, Texas.

For additional information, write to the Secretary, Board for Lease of University Lands, University Station, Austin, Texas.

Alex Edmonds 1, ne ne 16-20n-5w, dr 3508 ft. United Gas P. S. Co. et al's Carter Unit 1, 32-20n-5w, 5¾ in csg 5722 ft, made 460 bbls oil thru ¾ in choke in 18 hours, cas pressure 750 lbs, tubing, 390, td 5748 ft (Travis Peak). J. B. Bond's Burgess 1, 3-20n-5w, arr acidize, td 5800 ft.

DE SOTO PARISH — Grogan Oil Co.'s Ramsey A-1, se nw 36-11n-11w, dr 1265 ft. Pearl Oil Corp. et al's Joyner 1, 28-11n-12w, install heavier rig, td 3030 ft.

FRANKKLIN PARISH — Jensen et al's Grayson 1, c ne 36-12n-6e, top Cockfield 575 ft, claim so, setting csg, td 1811 ft (Cane River).

GRANT PARISH—R. W. Fair et al's R. L. Gay 1, 46-6n-3w, elev 100 ft, top Cockfield 1070 ft, top Cane River 2262 ft, top Wilcox 2605 ft, so 2888 ft, dr 3960 ft, black shale. H. M. Smith and J. V. McConnell's McNeely 1, 16-6n-3w, elev 94 ft, so in top Cockfield 1450 ft, dr 1573 ft Cockfield.

LINCOLN PARISH—Burford et al's Nanna 1, w½ se 34-18n-4w, lcn. H. D. Easton & Belmont Quadrangle Drlg. Co.'s G. W. Dye 1, ne ne 21-19n-4w, 9⅝ in csg 2149 ft, dr 2200 ft. E. T. Oakes, Easton & Evans' R. L. Sanderson 1, 30-18n-1w, dk. Glassell & Glassell's A. P. Gray 1, 16-20n-3w, elev 196 ft, dr 4830 ft shale and lime.

MOREHOUSE PARISH—Rondeau et al's Clarke 1, 10-20n-7e, owdd, td 3755 ft.

NATCHITOCHES PARISH—Jack Lent et al's Locke 1, 26-9n-9w, elev 201 ft, top Midway 1589 ft, top chalk 2459 ft, sd 2932 ft, chalk. Roy Raines et al's Allen Plantation 1, nw ne sw 22-9n-10w, woc surf csg 220 ft.

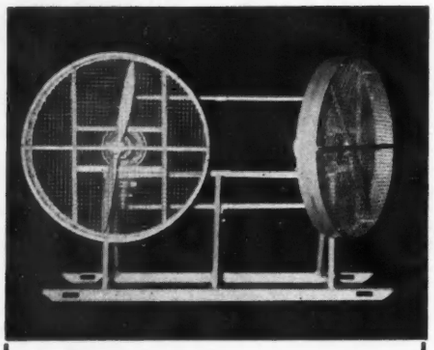
RAPIDES PARISH—C. L. Decker's Lee Lbr. Co. 1, se ne 21-5n-3w. F. W. Martin & Co.'s Hill 1, 24-5n-4w, fsg 580 ft. R. D. Webb's Brasher 1, 22-4n-2w, fsg 5255 ft.

RED RIVER PARISH—Whitehurst et al's Le Long 1, n½ 25-12n-11w, mim.

SABINE PARISH—Deep Rock Oil Co. & Kirk-Greenway's Whitney Corp. 1, 8-9n-13w, showed sw 5709 ft, arr deepen. A. C. Scott et al's Bowman-Hicks 1, 23-9n-13w, wosr, td 3088 ft. E. Howard, Tr.'s Sabine Lbr. Co. 1, ne ne nw 24-9n-12w, dk.

TENSAS PARISH — Ark. La. Gas Co.'s Hardwood Timber Co. 1, c nw 8-11n-10e, mim. Howard Jones' Sherrouse & Snyder's Chicago Mill & Lbr. Co. 1, 30-12n-10e, owdd, 798 ft.

WEBSTER PARISH—Magnolia's D. G. Cox 2, 22-21n-10w, dr 7236 ft. Ira Cox 6, dr 5710 ft; G. W. Cole 2, dr 5578 ft. Ohio's A. J. Hodges 2, 23-21n-10w, 7-in csg 8476 ft, csg perf at Bodcaw sand, testing, td 8517 ft; A. H. Gray 1, Acct. 2, 26-21n-10w, 7-in csg 8409 ft, perf at 8060 ft, testing, td 8439 ft; S. P. D. Coyle 1, 23-21n-10w, woc 7-in csg 8452 ft; R. M. Coyle 2, 22-21n-10w, dr 7990 ft; L. M. Gardner 1, dr 8003 ft. Standard's E. L. Stewart 1, 32-21n-10w, elev 240 ft, base massive anhydrite 4761 ft, top Travis Peak 6005 ft, cored Holloway sand 6027-38 ft, no show, 7-in csg 6050 ft, dr 6210 ft. Woodley Pet. Co.'s Gray B-4, 27-21n-10w, 7-in csg on bottom at 8444 ft, perf with 34 shots at Bodcaw sand 8094-8109 ft, making 400 bbls distillate and 5 mil ft gas daily through 9/32 in choke, tub press 3850, cas press 2900 ft.



Adjustable . . .
TWIN BUG BLOWER
Sold Thru Supply Stores

The 8 ft. Adjustable Twin Bug Blower has the more efficient two blade 40-inch Airplane type propeller of cast aluminum alloy which is not affected by the weather. Being adjustable this blower will affect more derrick floor area than other types.

GARROTT BRASS & MACHINE CO.
1718 ENNIS ST. HOUSTON, TEXAS

SOUTH LOUISIANA

ACADIA PARISH—Humble's Federal Land Bank 1, North Crowley prospect, 34-8s-1e, td 8037 ft, pb and preparing to sdtr. John Mayo et al's Bank of Commerce & Trust 1, e of Tepetate field, 19-7s-1e, spudded.

CAMERON PARISH—Humble's Bel Hanszen 1, Hanszen prospect, 5-12s-6w, dr shale 5607 ft. Pure's State Mallard Bay 2, Mallard Bay prospect, 14-13s-3w, driving piling. Superior's State Gulf of Mexico 1, in Gulf of Mexico, 4-15s-8w, driving piling.

EAST FELICIANA PARISH—Cavalier Oil Co.'s Bickman 1, Port Hudson area, 88-4s-1w, dr shale 5049 ft; same operator's Elliott 1, 3-8s-2e, dr shale 2185 ft. G. C. Koch et al's Andrews 1, Clinton area, 69-2s-3e, dr below 1121 ft.

IBERIA PARISH—Hamil & Smith's Dave Baez 1, Patoutville area, 35-12s-7e, dr shale 7000 ft. Jefferson Lake Oil Co.'s Lake Peigneur 414, Jefferson Island dome, 12s-5e, pb from 6490 ft, sdtr 5797 ft, dr shale 6069 ft.

JEFFERSON DAVIS PARISH—Louisiana Crusaders Oil Co.'s Langley 1, Fenton area, 36-7s-5w, sd woo at 8575 ft. Stanolind's Calcasieu National Bank B-2, China prospect, 28-7s-3w, dr shale 7422 ft; same operator's Calcasieu National Bank 2, South Jennings area, 10-10s-3w, dr shale 8609 ft. Union Sulphur & Shell's T. R. S. Farms 1, South Roanoke area, 23-10s-4w, dr shale 4587 ft.

LAFOURCHE PARISH — Fohs Oil Co.'s State Long Lake 1, Bourg prospect, 65-17s-19e, woc 9406 ft. Gulf's State 3, sw of Marchland prospect, 36-23s-21e, mim. William Helis's City of New Orleans 1, Marchland prospect, 19-23s-23e, abn 8012 ft.

PLAQUEMINES PARISH — Gulf's State Bay Adams "PP" 2, in Bay Adams, 32-19s-28e, abn 4678 ft; same operator's State Quarantine Bay "QQ" 3, 17-19s-17e, lcn. Tide Water's Manhatten Fruit Co. 3, Venice dome, woc 2451 ft.

ST. BERNARD PARISH—Gulf's Lake Lery 2, Lake Lery prospect, 28-14s-14e, dr shale 6411 ft. Southern Sulphur Co.'s State 2, Lake Borgne, 38-14s-15e, dr shale 3199 ft.

ST. CHARLES PARISH—Amerada-Louisiana Land & Exploration Co.'s State Bayou Des Allemands 1, Black Prince Island prospect, 13-15s-20e, setting 9⅝-in csg 7124 ft.

ST. LANDRY PARISH—Gulf's Haas-Hirsch 1, Krotz Springs area, 12-6s-7e, dr gumbo 1500 ft.

ST. MARTIN PARISH—Joe E. Lilly et al's Martin 1, Section 28 prospect, 32-10s-7e, woo at 4450 ft. Texas Co.'s State Mongoulio 3, Lake Mongoulio prospect, 14-10s-9e, sdtr 7600 ft.

ST. MARY PARISH — Texas Co.'s State Bateman Bay 1, Morgan City prospect, 21-16s-12e, dr shale 10,110 ft; same operator's Horseshoe Bayou 1, on Horsheshoe Bayou, 40-17s-9e, preparing to dr ahead below 12,261 ft.

VERMILION PARISH — Continental's Brookshire 1, Abbeville area, 66-12s-3e, dr shale 2187 ft.

MONTANA

FALLON COUNTY—Tower Oil Trust's 1, sw nw 8-9s-61e, mim.

PETROLEUM COUNTY—H. Clark Rowland et al's Kalispell 1, ne ne se 35-14n-25e, resuming dr from 810 ft.

ROOSEVELT COUNTY—J. W. Schmidt's Frye 1, nw nw ne 21-28n-50w, dr 500 ft.

TOOLE COUNTY—Model Oil's 1, ne sw 5-37n-3e, mim.

YELLOWSTONE COUNTY — Broadview Dome Oil Co.'s Halbritter-Stoltenberg 1, se nw 18-3n-23e, spd.

NEBRASKA

DAWES COUNTY — Stephens Petroleum Corporation's S. J. Palmer 1, nw sw 10-35n-50w, sd 2555 ft for derrick repairs.

KEITH COUNTY—20th Century Oil Co.'s Struken 1, cnw nw 21-14n-37w, ru.

SIOUX COUNTY—J. M. Huber Corporation's Morgan 1, csw sw 32-35n-56w, dr 2915 ft.

OKLAHOMA

ALFALFA COUNTY—Olson Drlg. Co. et al's Acre 1, csw ne 14-24n-11w, fsg 3700 ft.

BECKHAM COUNTY—Mid-American Oil Co.'s Biscoe 1-A, sw sw sw 28-8n-22w, fsg 1945 ft. Carter Oil Co.'s Porter 1, csw sw 36-10n-25w, woc 3635 ft. Carter's Bingham 1, ne ne ne 31-8n-26w, dr 1928 ft.

CADDO COUNTY—Clyde Becker et al's Pharris 1, cse se nw 24-6n-12w, dr 800 ft.

CARTER COUNTY — Shell Pet. Corp.'s Smith 1, cnw se ne 30-5s-1e, rur.

CLEVELAND COUNTY — Hollenback's Stinson 1, nw nw ne 17-9n-2w, sd 6195 ft.

COMANCHE COUNTY — C. V. Morris' Young 1, se ne se 24-3n-10w, dr 1000 ft. C. Holliday's Kuntz 1-A, cse ne se 21-4n-11w, sd.

GARFIELD COUNTY—Ohio Oil Co.'s State 1, sw sw sw 13-23n-2w, dp stuck 5183 ft.

GARVIN COUNTY—Carter Oil Co.'s Potts 1, ce½ se nw 36-1n-3w, c&p.

GRANT COUNTY—Carter Oil Co. et al's Crisman 1, nw sw nw 16-25n-3w, ru & wo wtr. Carter et al's Kolarik 1, csl s½ sw 4-26n-5w, woc 348 ft.

HASKELL COUNTY—Continental Oil Co.'s Anderson 1, sw se ne 33-8n-20e, dr 4080 ft.

HUGHES COUNTY—Cap Rock Oil Co.'s Parks 1, csw se 34-7n-8e, dr 4020 ft. Chas. Thornton's Eason 1, ne ne nw 7-9n-11e, dr 2154 ft. E. H. Moore's Buck 1, nw sw sw 21-8n-10e, dr 3020 ft. H. H. Ellis' Tiger 1, nw se sw 29-6n-8e, dr 80 ft.

JACKSON COUNTY—Ace Gutowsky's Howard 1, sw sw nw 10-3n-19w, dr 300 ft.

JOHNSTON COUNTY — Neff-Godfrey's Chapman 1, csw se sw 36-4s-4e, lcn.

Pierce
Universal Governors

***Meet Every Requirement*—Pierce Governor outfits, complete, are available for nearly all standard industrial engines, but the Pierce Universal Governor was developed especially for automotive engines that have been converted into stationary power plants. These governors can be used on any make or model of engine. They are suitable for governing any engines used for operating pumps, welding generators, lighting generators, air compressors, hoists, etc.**

CLOSE REGULATION—Pierce Universal Governors are belt driven and either flat or V-belts may be used. The governors are of the centrifugal (or flyball) type and respond instantly to each change in engine load, maintaining a uniform speed regardless of load variation.

Because of their efficiency, Pierce Governors have been regular equipment on a majority of the standard industrial engines and on various types of industrial machines. No better governors are obtainable. Write for literature and prices.

The Pierce Governor Co.
600 Ohio Avenue, Anderson, Ind.

KAY COUNTY—Higdon et al's Nieman 1, ne nw ne 9-26n-3e, td 519 ft, dr by tools.

KIOWA COUNTY—Kiowa Oil Corp.'s Finder 1, csw ne 4-6n-20w, sd 130 ft. Argus Pet. Co.'s Osbourne 1, nw nw ne 9-7n-16w, bail & co.

LATIMER COUNTY—Clark Drlg. Co. et al's Wilson 1, cse se 15-5n-18e, dr 5705 ft.

LINCOLN COUNTY—Exchange Drlg. Co.'s Dowell 1, se se nw 10-14n-6e, td 3065 ft, to shoot.

LOGAN COUNTY—Helmerich & Payne et al's Randall 1, sw sw ne 24-16n-1w, dr 4297 ft. Eason Oil Co.'s Sisters 1, sw sw sw 24-17n-1w, dr 5423 ft.

LOVE COUNTY—Sinclair Prairie's Stockton 1, se se sw 26-6s-2w, woc.

MARSHALL COUNTY—Stewart & Taylor's Chestnut 1, ne ne ne 23-8s-5e, testing.

McCURTAIN COUNTY—Wilcox O&G Co.'s No. 1, sw se sw 30-2s-27e, matr on grnd.

MURRAY COUNTY—Russell's Fee 1, se nw se 9-2s-3e, dr 2134 ft. O. O. Owens' Fryer 1, ne se ne 34-1s-3e, dr 1812 ft.

NOBLE COUNTY—Lincoln Oil Co. et al's Neil 1-A, ne ne ne 15-23n-2w, fsg 4826 ft. Summitt Drlg. Co. et al's Dolezal 1, se se sw 8-22n-1w, dr 4965 ft. Magnolia Pet. Co.'s Forsythe 1, se se sw 23-21n-2w, td 5393 ft, D&A. Stanolind & Amerada's Johnson 1, nw nw se 4-20n-2w, dr 2850 ft.

OKLAHOMA COUNTY—Sunray Oil Co.'s Dickson 1, nw nw nw 17-11n-1e, mit.

OSAGE COUNTY—Mid-Co. Oil Corp.'s No. 1, se se sw 22-23n-6e, set 10-in csg 1320 ft, dr 1680 ft.

PAWNEE COUNTY—Carter Oil Co.'s Wells 1, ce½ se nw 30-23n-5e, td 850 ft.

PAYNE COUNTY—H. F. Young's Jenkins 1, se ne se 4-17n-3e, dr 4595 ft. Riddle's Van Zandt 1, nw nw se 16-18n-3e, dr 2300 ft.

PONTOTOC COUNTY—Southern Oil Co.'s Young 1, ne ne se 17-3n-7e, dr 125 ft. Papoose Oil Co. et al's Jones 1, nw se nw 2-4n-5e, td 2840 ft, D&A. Roodhouse et al's Booth 1, se nw se 20-2n-6e, dr 3720 ft. Clark Drlg. Co. & Delaney's Richardson 1, se se sw 30-4n-8e, dr 2110 ft. Sandbach et al's Whittaker 1, nw ne se 31-4n-6e, dr 3540 ft. Boettcher O&G Co.'s Cann 1, se nw ne 25-4n-7e, dr 1426 ft. Norbla Oil Co.'s Kennedy 1, se se ne 13-2n-5e, dr 232 ft. Union Dev. Co.'s Abbott 1, sw nw ne 34-3n-6e, dr 280 ft.

POTTAWATOMIE COUNTY—Stanolind & Amerada's Billington 1-B, sw se sw 32-9n-3e, dr 4330 ft. Rich Oil Co.'s Fidler 1, ne ne nw 9-5n-5e, rur. Atlantic Ref. Co.'s Dooley 1, se se sw 9-11n-5e, dr 1940 ft. Mid-Continent Pet. Corp. et al's Ne-Thah-Pea-Se 1, se se ne 24-11n-4e, dr 2410 ft.

PUSHMATAHA COUNTY—Erle Halliburton et al's Bogwell 1, sw ne ne 30-3s-15e, dr 2325 ft.

STEPHENS COUNTY—Carter Oil Co. et al's Harley 1, cne ne 24-2s-4w, dr 5545 ft. Wm. Angle et al's Sid Lang 1, sw sw ne 24-1n-7w, sd 3525 ft. Coline Oil Co.'s Johnson 1, csw se ne 1-2n-8w, to dd. Ed Parson et al's Blake 1, csw nw 22-2n-8w, bldg der. Helmerich & Payne's Graham 1, csw sw ne 12-1n-5w, td 5014 ft, mirt.

TILLMAN COUNTY—I. T. I. O. Co. et al's Hatler 1, csw ne 32-2s-17w, pumping. Magnolia Pet. Co.'s Brown 1, csw se ne 21-3s-18w, td 6484 ft, D&A. Cavens et al's Southerland 1, sw sw nw 35-4s-16w, rur.

WASHITA COUNTY — John Koberg's Harms 1, cnw nw ne 6-10n-16w, spd 50 ft.

SOUTH TEXAS

LAREDO DISTRICT

DUVAL COUNTY—Government Wells Oil Co. Inc.'s H. A. Lundell 1, sec 140, coring 1503 ft. Kepley Prod. Co.'s Clara Driscoll Sevier 2, sec 71, dr 2683 ft. King Drilling Co.'s Atlee Parr 1, 400-ac lse San Andres gr, sp. Magnolia Pet. Co.'s F. Weil et al 1, sur 565, dr 1076 ft. Penn-Palangana Oil Co. et al's C. K. Gravis 1, sec 254, coring ahead, tested snd, no shows, td 4220 ft. Reliance Oil & Royalty Co.'s D. Ruiz Est. 2, C&M Ry. sur 125, com 35 bbls per day on pump, 7-in csg set at 2636 ft, top snd td 2649 ft. Reynosa Oil Co. et al's F. G. Wilson 1, blk 9, Sweden subd, turned into tanks, td 4775 ft. Standard Oil Co. of Kansas' Mabel Rossi 1, blk 1, Sweden subd, rig on ground & wtr well completed. Trahan & Tuttle's J. C. Megerle 1, sur 245, stdg 1100 ft. George V. Viteri et al's Emilio E. Cadena 1, 280-ac tr, blk 5, G. Stewart O&G subd, Cadena Lands, dr 6055 ft.

McMULLEN COUNTY—Edwards & Zoch's Two Rivers Ranch 1, sec 60, lcn. Harrison & Danvers' J. A. Jungman 1, M. Hely sur, abnd 1270 ft. Harvey & Henderson's Nueces Lnd. & Livestock 1, sec 105, wait on rig. W. L. Hinds' Douglas W. Rhodes 1, H. Nadler sur, no report, roads impassable to lcn. W. P. Howard's B. C. Claunch 8, M. Hely sur, fshg 1120 ft. Howell Oil Co.'s J. H. Martin Hrs. 1, sur 218, sd for fuel, td 2832 ft. Edwin M. Jones' Harry Ezzell 5, sec 39, H. M. Brewer sur, wor; Harry Ezzell 6, C .Q. Ragland sur, wor, wtr well

OTIS REMOVABLE BOTTOM HOLE CHOKE POSITIVELY PREVENTS FREEZING AT THE SURFACE CONTROLS!

- Set in the lower portion of the tubing in a high pressure well, the choking is done in the higher bottom hole temperature, thus raising the temperature of production. Eliminates use of costly heating equipment at the surface.
- It reduces high tubing surface working pressure to trap or gathering line pressure, and practically eliminates cutting of surface connections.
- Chokes are run and pulled by experienced engineers, who determine proper choke diameter for desired rates of flow.
- Field proven in hundreds of high pressure wells over a period of years. Never has it failed to measure up to claims made for it.

PRESSURE CONTROL - OTIS - SERVICE - EQUIPMENT

OTIS PRESSURE CONTROL, INC.

DALLAS, TEXAS

Hobbs, N. M. Houston, Texas Oklahoma City, Okla.
Glendale, Cal. Shreveport, La. Ada, Okla.
Wellsville, N. Y.

The Otis Removable Bottom Hole Choke is fully patented.

ACIDIZING HAND BOOK

By BENSON M. KINGSTON

A timely, thoroughly practical book on a most important subject

Acidizing Hand Book takes up the purpose of acidizing, gives full information on formations which are treatable, tells how to determine treatability of formations, how to prepare a well for acidizing, and contains a section of tables extremely valuable to an operator planning to acidize a well.

The book is divided into 14 chapters which include:

Chemistry and Geology of Treatment—Treatment Acid—Preparation of Wells for Treatment—Mechanics of Treatment (4 chapters)—The Reaction of Salt Water to Treatment—Producing the Well After Treatment—Acidizing Gas Wells—Re-treatment and Multiple Stage Treatment—Other Uses of Muriatic Acid in the Field, and Computations in Acidizing.

The author has had many years of experience in practical work acidizing wells.

The Acidizing Hand Book has a Fabrikoid binding, size 5½ x 8 inches, and contains 78 pages.

PRICE $1.50, POSTAGE PREPAID

Address Book Department

Gulf Publishing Co., Houston, Texas

completed. J. T. Lanier's E. R. Hagist 1, sur 481, sd to clear titles, depth questionable but below 1145 ft. C. C. Shumway et al's Shiner Ranch 10, sec 51, dr 350 ft.

STARR COUNTY—Calderoni-James-Follette's Francisco Rodriguez 1, sh 56, por 30 J. of Camargo, sd 150 ft. Carter & Stiernberg's Quirino Vela 1, dr 416 ft. John H. Clopton et al's Dioncio Tijerina 4, sh 14-C, por 80, sd for heavier rig, td 1630 ft. Cook, Maris, Arnold's Starr County Cattle Co. 2, Cook, Maris, Arnold's sur, por 89, coring 2452 ft. W. F. Dolgener et al's Y. Garcia de Garcia 1, sh 7-B, por 71, J. of Mier, no report, td 402 ft. K. E. Merren's Starr County Cattle Co. 1-A, in por 89, blk 34 of Jefferies & Lambeth subd, flowed 396 bbls 58 grav amber crude variable chokes ranging from 1/3 to 5/32 in, tp 2200 lbs, cp 2350 lbs, td 5418 ft. Henry Mode et al's Kelsey Bass 1, blk 7, por 87, dr ahead, expect production horizon about 2500 ft, td 2300 ft. Moss & Heard's S. B. Ricaby 4, por 83, waiting on cement. Transwestern Oil Co. et al's T. B. Slick Est. 2, sec 527, sd in pb hole at 5200 ft, td 5659 ft.

WEBB COUNTY—Mills Bennett Prod. Co.'s M. D. Slator 3, blk 92, Slator subd, d&a 1551 ft. Bolling & Coffey's A. Villareal 1, blk 17, sur 768, contract depth, prep to dd, corrected top Mirando 1372 ft, top Schott 1712 ft, top Rosenburg 1885 ft, td 2516 ft. C. C. Bonner et al's Cuellar Bros. 1, sh 4, abnd below this depth, td 2950 ft. Dolores Oil Co.'s Emma Adami, sur 15, d&a 1501 ft. Eugene Garner Jr.'s R. Saldivar 2, sur 657, pumping 2 or 3 bbls per day, prep to acidize, 7-in csg at 990 ft, td 1000 ft. Ina Oil & Ref. Co.-F. M. Shaver's W. E. Trafton 1, sur 281, part of tools on lse stdg. O. W. Killam's F. Perez 1, sur 1007, lcn. J. W. Magee's E. Garcia 1, Henry James subd, blk 21, sp&sd 40 ft. Perkins, Cullum & Achning's Louisa R. de Garza 1, sur 711, ru. Randon Oil Co.'s Joe C. Palmer 1, sur 474, pits dug.

ZAPATA COUNTY—Allison & Abrams' S. Vela 1, sur 259, dr 300 ft. O. W. Killam's A. M. Bruni Est. 1, blk 83, Killam sub, El Ranchito pasture, J. V. Borrego gr, sp. H. Q. Lewis' S. Benavides 1, blk 39, Fansler & O'Hern subd, ran electric formation tester, abnd 2203 ft. Ray L. Martin's S. Vela 1, blk 44, sh 2, lcn; S. Vela 1, blk 77, sh 4, lcn. J. O. Sheffield's C. H. Buck 1, sur 273, dr 1250 ft.

for your every need

A complete line of shipping and merchandising tags—Including those for your special requirements. . . . Prompt, personal service that saves you time and money.

ALL KINDS OF BUSINESS ENVELOPES . . . We manufacture and print envelopes of every description—built to give maximum utility, security and economy.

GULF ENVELOPE CO.

617 Brooks St. P.O. Box 164

Phone Fairfax 4171

CORPUS CHRISTI DISTRICT

ARANSAS COUNTY—Barnsdall Oil Co.'s Kate Edwards 1-A, Wm. Lewis sur, dr 8465 ft. W. J. Collins & Broughton Wilderson's McCampbell Ranch 1, blk 10, td 7121 ft, in sh, woc, set 7-in at 7121 ft, cored 6789-96 ft, snd, w, gas & distillate.

BEE COUNTY—Butler & Turner's J. R. Scott 1, sec 7, Howeth & Swiger subd, top Pettus 4426 ft, dr td 4450 ft. J. R. Dougherty's R. T. Hicks 2, blk 47, ru. Illinois Pet. Corp.'s Mrs. M. M. McKinney 2, L. C. Randolph sur, d&a 4264 ft. Fred Shields et al's Homer Harris 1, P. Wilcox sur, abnd 4821 ft, snd 4476-82 ft.

BROOKS COUNTY—Gifford Oil Co.'s Wm. Singer 1, sur 630, coring 3373 ft. Standard Oil Co. of Texas' Mestina Oil & Gas Co. 1, R. G. Salinas sur, lse 2, coring 4776 ft.

CAMERON COUNTY—Ruez-Morton Inc.'s United Land Irr. Co. 1, lot 7, blk 402, dr 2640 ft. Saxet Prod. Co. & A. W. Phillips' Port Isabel et al 1, sh 29, Espiritu Santo gr, mir. Stapper Pet. Corp.'s Port Isabel Irr. Co. 1, blk 17, sh 29, 30 & 31, dr 8000 ft.

GOLIAD COUNTY—Dirks Bros.' Dr. G. W. Allen 1-A, Obid Marshall sur, mim. Goliad Oil Co.'s S. E. Cole 1-A, lot 33, range 4, Goliad Town tr, sp.

HIDALGO COUNTY—Dayle L. Smith Oil Co.'s Fairbanks & Young 1, blk 14, por 46, temp abnd 2350 ft.

JACKSON COUNTY—Cockburn Oil & T. Hargrove's Santa Theresa Farms 1, I&GN sur, ru. George J. Greer et al's J. R. Davis 1, D. H. Hoffman sur, dr 2057 ft.

JIM WELLS COUNTY—John Camp Prod. Co.'s J. W. Bird 1, 425-ac tr, Los Presenos de Abajo gr, dr 5420 ft; W E. Pope 2-B, sec 13, dr 1500 ft. Magnolia Pet. Co. et al's A. A. Seeligson 7, Los Jaboncillos sur, dr lime & sh, td 3975 ft. Premont Royalty Co.'s H. Fealey 1, sec 72, showed sw 2250 ft & 2350 ft, dr ahead 2380 ft. Smith Drlg. Co.'s W. D. Wade 1, lot 1, blk "B" Bode subd, perf with 9 shots, comp flowing 52 bbls per day 51 gr oil 5/32-in ch, tp 1750 lbs, cp 1850 lbs, td 5701 ft. Tom Graham's (Tsesmelis' & Reese's) Martha Earhart 1, John Suggs sur, taken over by Tom Graham and new operator cemented 5½-in csg 3170 ft, to perf in 3100 ft snd, td 4005 ft. Wellington Oil Co.'s Clara Driscoll Sevier 1, La Anima Sola gr, ab 545, dr 5668 ft.

KARNES COUNTY—Victoria Dr. Co.'s John Yanta 1, S. G. Hardaway sur, may be deepened at later date, td 1575 ft.

KLEBERG COUNTY—John F. Camp Prod. Co.'s C. Phillip Wardner Tr. 2, e½ of Paco Ancho de Arriba gr, bldg drk for 7500 ft test.

LIVE OAK COUNTY—R. A. David's John & J. P. Marbach 1, Stephen sur, sd for orders top shells 872 ft, td 885 ft. R. H. Feltner et al's Sanger Ranch 2, GC&SF Ry sur, top cole 1957 ft, top Gov't Wells 2790 ft, oil show 2833-37 ft, top Hockley 2358 ft, drilling 2874 ft. Loma Oil Co.'s L. Jacob Corp. 8-B, GH&H sur, lcn. Loma Oil Co.'s C. L. Terrell 1, J. Houghihan sur, dr 674 ft. F. D. Salter et al's I. W. Griffith 2, J. D. Osborn sur, fshg 924 ft.

NUECES COUNTY—Mills Bennett Prod. Co.'s William Heuermann 1, C. Land sur 408, sp. J. K. Culton's I. M. Singer 1, blk 39, lot 13, Flour Bluff & Encinal Gardens, ru. Fain Gillock et al's Robert Poenisch 1, lot 11, sec 32, ru. W. L. Hinds' Lucy J. Rivers 1, sec 301, Bishop subd, dr 3760 ft. Navarro Oil Co.'s E. M. Poenisch 1, lot 21, blk 41, lcn abnd. Phillips Pet. Co.'s John Harney 1, sh 11, Harney Lands, coring 6960 ft. Seaboard Oil Corp.'s James P. Luby 1, sec 2, blk 4, Luby subd, prep dr plugs td 5332 ft. Shell Pet. Co.'s State of Texas 1, Laguna Madre Bay, piling driven & sd. Sloan-Harvey & Green River Oil Co.'s Eno Cassens 1, sec 26, Agua Dulce Farm Lots, lcn, abnd. Southern Minerals Corp.'s Richard King 1, sec 32, King Farm Lots, trying to pull stuck dr stem, td 6515 ft; H. G. Yakey 1, sec 38, King Ranch subd, drk. Taylor Pet. Co.'s J. V. Styles 1, sec 18, dr & coring 5820 ft. United Prod. Corp.'s W. H. Harvey 1, Garcia sur, reperf 7376-84 ft, tested salt water & oil, td 9002 ft. Chew & McIntire's Willie & Emma Daaman 1, sec 16, lcn abnd, lcn changed. J. V. Chew & O. V. McIntire's F. E. Kloesel 1, sec 11, Bonnie View Ranch subd, lcn. Edwin M. Jones' Ben Shelton 1, Refugio Town gr, sp. Randon Oil Co. & American Liberty Co.'s J. Vincent 1, CEIP&M sur 41, drk & mir for 6000 ft test. United Prod. Co.'s I. J. O'Brien 12, Refugio Town Tracts, dr 8840 ft, reported to have had about 130 ft of snd in Vicksburg, td 8840 ft.

SAN PATRICIO COUNTY—Conroe Drilling Co.'s F. L. Foley 1, C. F. Delmas sur, coring 5232 ft. Danrey Oil Co.'s Jean Davis 1, Wm. Boyd sur, sp with light rig. Eleanor Oil Co.'s J. F. Green Est. 1, T. T. Williamson sur, prep to set csg at around 6800 ft, to test several shows, td 7305 ft. Humble Oil & Ref. Co.'s John S. McCampbell 1, R. Martinez sur, set sur csg, now waiting on cement. Phillips Pet. Co.'s B. E. Ivey 1, sec K, Pauls subd, oil sand with salty taste 5345 to 5354 ft, td 5410 ft.

VICTORIA COUNTY—G. M. Richardson et al's Mrs. K. Noll Est. 1, C. W. Vickery sur, dr sndy sh, td 3147 ft. Transwestern Oil Co.'s A. M. McFaddin 3, I. Viarin sur, dr 5515 ft.

WILLACY COUNTY—Ruez-Morton Inc.'s Francisco Armendiaz 1, Little sh 4, drk; Johnson-Stillman 1, lot 14, blk 25, sh 44, San Juan de Carricitos gr, dr 2300 ft. Shell Pet. Co.'s Yturria Lnd. & C. Co. 1, sh 64, San Juan de Carritos gr, dr shaley sandstone, td 10,263 ft.

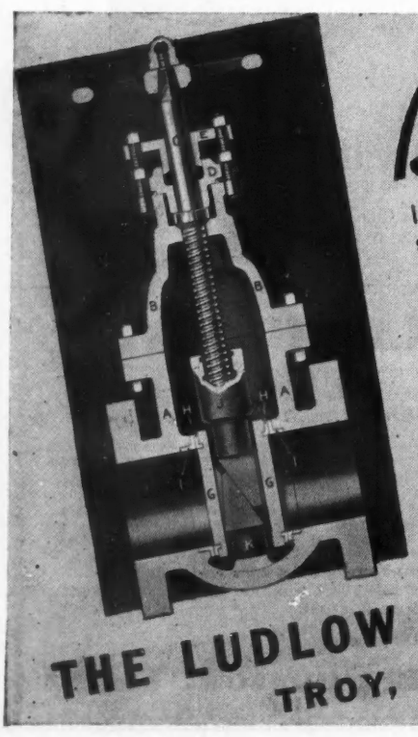
SAN ANTONIO DISTRICT

ATASCOSA COUNTY—Priest et al's Birdwell 1, tr 45, J. P. Gorman sur, dr 1725 ft. A. T. Crane et al's R. B. Watson 1, A. C. Curver sur 71, stdg 2035 ft.

BASTROP COUNTY—Sure Oil Co.'s C. Y. Powell 1, J. G. Welchmeyer sur, sp.

BEXAR COUNTY—Algra Oil Co.'s Edwards G. Peters 1, Miguel Gotari sur, sd 815 ft. American Gas Co.'s Oliver 5, M. F. Rodriguez sur, cleaning out, will redr later, td 3425 ft. Carle Chemical Co.'s Frank P. Carle 1, 343-ac tr, crevice in lime (Edwards?), d&a, td 311 ft. Carter & Ingersoll's Louis Mann 1, Stephen Jett sur 53, reinstated, cleaning out & trying to work over, bails about 2 or 3 bbls oil per day, td 1357 ft.

CALDWELL COUNTY—Allbright et al's C. P. Smith 1, James Berry sur, ru. B. C. Armstrong et al's Wilson Bell 1, Luling Townsite, drk. R. T. Belcher's Mrs. G. Moody 1, Solomon Seal sur, lcn cleared. E. R. Cosby's W. H. Cosby 1, Maxwell sur, d&a 1847 ft. Fain Gillock's Mrs. J. P. Walker 1, A. Floyd sur, lcn. W. E. Housel et al's M. C. Driscoll Sur, sd 1544 ft. J. O. Mack's B. Withers 1, W. House sur, dr 1150 ft. McNeil Pet. Corp.'s Will Clark 1, J. R. Miller sur, dropped same as Sherman Nelson's No. 1 Clark completed last week. Richardson Pet. Co.'s Patterson 1, Wm. Pettus sur, set 5-in csg at 777 ft, woc at 780 ft; J. M. Tremmell 1, E. Berry sur, sp. Rosita Oil Co.'s Lockhart State Bank 1, John Roe sur,



Built to LAST

Install Ludlow valves in high pressure oil and gas lines. They give years of dependable performance under the severest working conditions.

The cutaway illustration shows the simplicity of Ludlow construction. Fewer and more rugged working parts mean less wear—easier repairs. And the Ludlow method of wedge closure assures complete tightness. Send for a Ludlow catalog.

THE LUDLOW VALVE MFG. CO.
TROY, NEW YORK

top ch 1980 ft, sd for csg td 2204 ft. Spokane Oklahoma Oil & Gas Co.'s K. Dougherty 1, J. Tyler sur, sd 675 ft. Stapper Pet. Co.'s E. Martin 1, A. Floyd sur, dr Taylor Marl, td 2405 ft. F. R. Williams' H. L. Rodenberg 1, James Berry sur, bailing crevice 2003 ft showing considerable oil, td 2010 ft.

DIMMITT COUNTY — Paul C. Teas & Maryland Oil Corp.'s S. E. McKnight 1, sec 23, lcn. Wilcox O&G Co.'s Light Ranch 1, I&GN sur, had fshg job, cleared hole, now dr below td 6630 ft.

EDWARDS COUNTY — Dan Auld's Mrs. Mamie Rigsby 1, sec 16, GC&SF sur, recovered about 1 bailer of 26 gravity sweet oil per hour 3922-43 ft, hard & dry lime 3942-50 ft, bailed 1 bailer of warm wtr per hr, now sd for orders, may deepen, td 3952 ft. Amon G. Carter et al's Frank J. Sweeten Ranch 1, sec 49, blk 2, GC&SF sur, mim.

FRIO COUNTY—Amerada Pet. Co.'s Mrs. D. D. Harrigan 1, blk 77, Salvador Flores sur 306, set 7-in csg at 5450 ft in new hole, td 6290 ft. H. A. Pagenkopf & L. C. Jameson's Blackaller Est. 1, James Courley sur, lcn 3250 ft, Edwards test will sp soon.

GONZALES COUNTY—Canoe Creek Oil Co.'s W. L. Bolts 1, W. A. Matthews sur, sd.

GUADALUPE COUNTY—R. T. Belcher's J. T. Fulcher 1, Robt. Smith sur, drlg Taylor Marl td 1895 ft. Ralph E. Fair Inc.'s Fritz E. Hemple 1, G. W. Williams sur, moving off rig, get swabbing machine 30 or 40 ft of oil on top of wtr in hole, same amount comes in in 10 hrs as in 2 hrs, td 2240 ft. Kennedy & Crowley's Gus Jahns 1, Jose K. Davis sur, sd 2607 ft. Riddle Oil Co.'s Ned Herff 1, Eligio Gortari sur, testing ch in pb hole 2209 ft. W. Scott Townsend's Tom Terrill 1, Jesus Cantu sur, sd rig under wtr, td 1700 ft.

HAYS COUNTY — Mallory, Holcomb & Nance's J. A. Hundenrich 1, W. Hemphill sur, btm ch 450 ft, set 4-in csg 650 ft, sd td 650 ft. N. G. Williams' Frances Jennings 1, Venmonds sur, lcn.

LEE COUNTY—Eleoussa Oil Co.'s Ira Sanders 1, J. Von Roeder sur, ran electric formation tester to 3673 ft, shows no oil or gas, td 3675 ft in ch, 6⅝-in csg set at 3612 ft, swung 2½-in tubing 3670 ft, top chalk 3664 ft, td 3675 ft.

MEDINA COUNTY—C. J. Webster O. & G. Co.'s Wm. H. Weimers 1, Joseph Haley sur 32, wait on water. Williams & Gulley's Noonan Ranch 1, H. B. Brinkhoff sur 318, sd, waiting on orders, td 350 ft.

MILAM COUNTY — Kingdorr Exploration Co.'s J. C. White et al 1, Bynum Wickson sur, sp. Minerva Ref. Co.'s Shelton Estate 3, Wm. Allen sur, no record.

TRAVIS COUNTY—J. F. Jourdan's Dr. J. V. Siegmund 1, A. M. Leavy sur, lcn. R. M. Kyle's W. D. Hunter 1, J. Burleson sur, dr 228 ft.

WILSON COUNTY—Maryland Oil Corp. et al's Cynthia N. Tremmell 1, M. May sur, dr 4680 ft. R. C. Stanley's E. M. Hierholzer 2, R. Salina sur, coring 850 ft.

WILLIAMSON COUNTY—J. Edward Mills' M. M. Olive 1, Simon Miller sur, mim.

EAST TEXAS BORDER COUNTIES

CASS COUNTY—United's J. W. Land 1, Robt. Potter sur, perf csg 6520-25 ft, in basal Glen Rose, gauged 1,050,000 cu ft gas, old td 7255 ft.

(All in Harrison County unchanged).

MARION COUNTY—Ark. La. Gas Co.'s C. C. Braden 1, Thos. Hanson sur, elev 211 ft, dr 6297 ft; Allen Houston 1, A. de los Santos Coy sur, woc 2020 ft. The Hunter Co.'s E. W. Fonda 2, A. de los Santos Coy sur, woc 2080 ft. Fohs Oil Co.'s Mary McReynolds 1, A. de los Santos Coy sur, dr 1095 ft. United Prod. Corp.'s J. H. Hutchinson 1, A. de los Santos Coy sur, rur. Mid-Continent Pet. Corp.'s Sory 1, A. de los Santos Coy sur, rur.

PANOLA COUNTY—Danciger O&R Co.'s J. W. Tatum 1, Alfred Bissell sur, spd and rur. Glassell & Glassell's Pierce & Chesbro 1, Julia Soape sur, 16-in csg 922 ft, dr 4165 ft lime and shale. Magnolia Pet. Co.'s E. A. Hull 2, Thos. Applewhite sur, elev 222 ft, 9⅝ in csg 5948 ft, hole clean, arr run electrical tester, td 6010 ft.

SHELBY COUNTY—Wm. Redditt et al's Pickering Lbr. Co. 1, Stephen English sur, elev 303 ft, top Blossom 2310 ft, trying to blow out, pumping in mud, td 4117 ft.

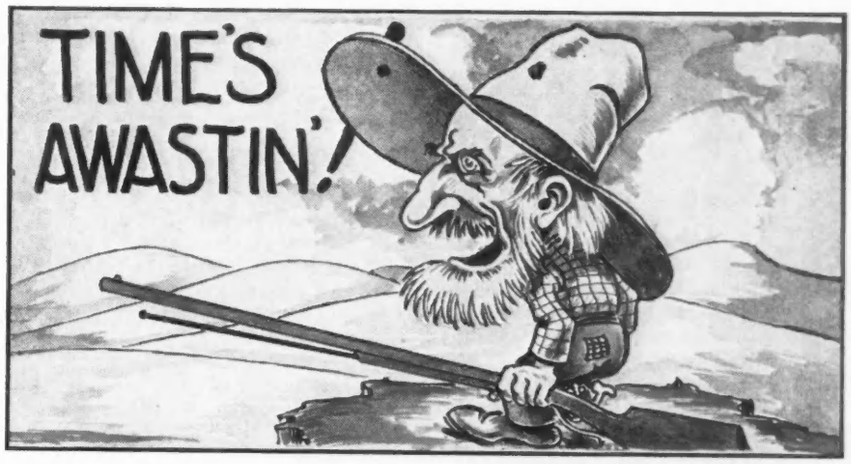
TEXAS GULF COAST

AUSTIN COUNTY—Cockburn & Hargrove's Bartay 1, w of Bellville, M. Steussy sur, mim.

BRAZORIA COUNTY — Pure's Slade 1, Peach Point prospect, S. F. Austin sur, abst 20, fsh 7842 ft.

COLORADO COUNTY — Humble's Relaw Land Co. 1, Eagle Lake prospect, J. L. Duggat sur, dr shale 5685 ft.

FORT BEND COUNTY—John Byers' Lockwood Sharp 1, near Smithers Lake, W. McMahon sur, sd 6500 ft. Marlen Oil Co.'s Jurea 1, Needville prospect, H.&T.C. sur, sec 26, dr



if your rig's not equipped with

UNIBOLT COUPLINGS

If you're using multiple bolt connections, you can't expect the boys to rig up and tear down as fast as they could with UNIBOLT Couplings. A single bolt (two bolts on the "big inch" type), which is under initial stress only, draws the tapered inter-locking shelves together and seals high pressures or high temperatures quickly, safely, perfectly.

You're a'wastin' time if you're not using UNIBOLTS.

2000-lb. test UNIBOLT for 6", 8" and 10" pipe. Available with blanking plug for compounding pumps and making dead-end lines.

THORNHILL CRAVER CO.
Houston UNIBOLT **Texas**

BALDWIN
SUPER SERVICE
AND *Full Flex*
OIL FIELD CHAIN
ask the Driller .. He Knows

***Factory Representative:* Geo. J. Fix, Dallas, Texas**
FOR SALE IN ALL OIL FIELDS

BIGGER, BETTER

CORES
with the
HUNT
WIRE LINE BARREL

Users of this modern retractable barrel get more and better core per dollar cost than by any other method of wire line coring. The core cutter is integral with the bit. The barrel seats in the bit and, having no strain on it, is thinner walled . . . permitting larger diameter cores, and less core distortion. Descriptive literature upon request.

Soft formation core head

Hard formation core head

HUNT TOOL COMPANY
HOUSTON TEX.
Formerly AUTHORIZED APPLEMAN BIT SERVICE CO.
HUNT WIRE LINE CORE BARRELS

BIT SERVICE SHOPS:
Houston, Joinerville, Talco, Corpus Christi, Bay City, Alvin, Texas . . . . . Rodessa, Jennings, Houma, Louisiana.

shale 3298 ft. Schwab & Gem Oil Co.'s Arcolla Sugar Mill 1, Arcolla prospect, D. Fitzgerald sur, mim.

HARRIS COUNTY—Humble's Settegast 1, Friendswood prospect, Perry & Austin sur, woc 1520 ft. Stanolind's Oates 1, Clinton area, C. Martinez sur, coring shale 8075 ft. Superior's Butler 1, Bammel area, J. Ehrhardt sur, dr shale 8278 ft.

JEFFERSON COUNTY—Magnolia's Phelan 1, Cheek area, S. Stivers sur, preparing to dr plugs at 8354 ft. Hebert & Smith's Broussard Hebert 1, Pine Island area, J. W. Gaffey sur, mim.

LIBERTY COUNTY—Jack Frazier's Hanchey 1, Hardin area, H. B. Johnson sur, dr shale 6709 ft.

MATAGORDA COUNTY — Continental's Hawkins 2, Sheppards Mott area, D. McCarthy sur, woc 5150 ft. Royal Oil Co.'s Ewing 1, Sugar Valley area, A. S. Sojourner sur, dr shale 5867 ft. Sun's Craig 2, Hawkinsville area, J. Williams sur, reaming 5965 ft. United North & South Dev. Co.'s Lambert 1, sw of Buckeye, M. Cotton sur, trying to blow out at 9972 ft; same operator's Stoddard 1, same area, M. Cotton sur, lcn.

MONTGOMERY COUNTY—G. E. Gates' Texas Long Leaf Lumber Co. 1, Splendora area, Walker County School Land sur, dr shale 4879 ft. Texas Co.'s Crawford 1, Willis prospect, U. Springer, sur, dk.

SAN JACINTO COUNTY—Cockburn et al's Whitten Estate 1, Keno area, Wm. West sur, sd 3100 ft.

UTAH

GRAND COUNTY—Cane Creek Oil Co.'s Government 1, nw sw 31-26s-21e, ru. Columbia Crude Corporation's Rath-Government 1, ne sw 12-25s-20e, dr 2265 ft.

EMERY COUNTY—Continental Oil Co. & California Co.'s Unit 1-A, nw nw 27-23s-11e, dr 4400 ft in hard sandstone.

WYOMING

CONVERSE COUNTY—Wyoming Southern Oil Co.'s Jennie Everett 1, nwc sw 26-32n-69w, co cave at 460 ft, td at 560 ft. Chadron Osage Oil Co.'s State 1, sw sw 16-32n-69w, dr 3600 ft.

PARK COUNTY—General Petroleum Corporation's Government 1, nw nw nw 33-37n-100w, still co at 5350 ft where premature explosion damaged casing and blocked hole.

Crew starts shooting Nesson Valley area in North Dakota

Williston, N. D.—A seismograph test crew under the direction of F. L. Bishop, Dallas, Texas, this week started a survey of the Nesson Valley area for Standard Oil Company of California. Engineers of the oil company simultaneously started surface survey work which will tie in with the subsurface mapping of the geophysical crew.

More than 130,000 acres in Williams and McKenzie Counties, northwestern North Dakota, are under lease by the company.

ECOLITE 50S
Is Just the Lantern All Oil Men Have Needed

It's Safe... Handy to Use Throws a Powerful Spot

Swing it on your arm, have your hands free and Ecolite 50S will give you a controlled, strong, powerful spot. It's made to order for gaugers, pipe men and other oil men who need a strong spotlight.

Ecolite is recommended by Underwriters' Laboratories. It has proven itself "Safe" even in the presence of inflammable gases and vapors.

AVAILABLE AT SUPPLY STORES
ECONOMY ELECTRIC LANTERN CO.
325 W. Huron St.
CHICAGO, ILL.

ECOLITE

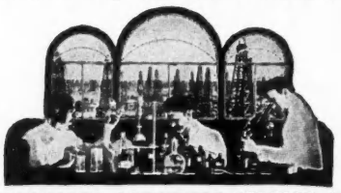
WANT TO BUY
Undeveloped or partially developed shallow oil lease.
J. T. BERTRAND
Gulf Building Houston, Texas

FOR SALE—CASH: National 3A6-1936 drilling machine with shear poles. Drilled three wells and in perfect condition. Also, complete string tools and accessories, 18" to 5-3/16" all perfect condition, 2 boilers, boiler house timbers, lumber, corrugated iron for derrick floor, house, engine house, etc. Also 361 ft. 75-lb. 15½", 1011 ft. 50-lb. 12½", 1408 ft. 40.5-lb. 10" Pittsburgh Seamless Steel casing Grade C Range 1 and 2005 ft. 32-lb. 8¼" and 2665 ft. 24-lb. 6⅝" Republic Electric weld steel casing Grade C Range 1 with casing shoes and clamps. Casing used in three wells, never tonged, and in perfect condition. Material located 20 miles northwest of Howard, Kansas. Will sell machine and casing for 70 percent of list and tools for 60 percent. Also 1800 ft. of good 28-lb. 8¼" casing, 12 miles from Howard, Kansas, at 52½c per foot.

FRANK ANDERSON
Phones 3-4032 and 4-1273
611 Union National Bank Building
WICHITA, KANSAS

W. P. JENNY
Geologist and Geophysicist
Gravimetric Seismic
Magnetic Electric
Surveys and Interpretations
2102 Bissonnet Houston, Texas

GEOPHYSICAL SOIL SURVEYS FOR OIL
10 Sample Survey $50. Total Cost: Mid-West



GEOLOGICAL SCIENTIFIC SERVICE CO.
FORT WORTH 957 E. Davis TEXAS

William M. Barret, Inc.
Consulting Geophysicists
Specializing in Magnetic Surveys
Contracts accepted for domestic and foreign projects, using the most improved instrumental and interpretative techniques.
GIDDENS-LANE BUILDING
SHREVEPORT, LOUISIANA

Fifteen Years Practical Experience
REPRESSURING
JO H. CABLE
PETROLEUM ENGINEER
Wichita Falls, Texas

DAVID DONOGHUE
Consulting Geologist
Appraisals » Proration « Statistics
Fort Worth National Bank Building
FORT WORTH, TEXAS

PATENTS
Patents, Trade Marks, Copyrights and Infringement Litigation
HARDWAY & CATHEY
428-29-30 Bankers Mortgage Bldg.
Phone Fairfax 8232 Houston, Texas

JACK A. SCHLEY
Patent Attorney
(Established 1902)
PATENTS—INFRINGEMENTS—OPINIONS
San Antonio—Washington, D. C.
2014 SECOND NAT'L. BK. BLDG.—HOUSTON
1807-11 TOWER PETROLEUM BLDG.—DALLAS

THE FORT WORTH LABORATORIES
Field Gas Testing. Analysis of oil field brines, gas, minerals and oil. Sell Thermometers, Hydrometers and Laboratory Glassware.
F. B. Porter, B.S., Ch. E., Pres.
R. H. Fash, B.S., Vice-President
828½ Monroe St., Ft. Worth, Tex.

NEW PRODUCTS FOR THE FIELD
Machinery • Tools • Catalogs • Books

STEAM DRIVEN COMPRESSORS

Worthington Pump and Machinery Corporation

Worthington Pump and Machinery Corporation, Harrison, N. J., announces an improved line of horizontal heavy-duty opposed steam-driven compressors incorporating dual cross-head design, tie-rods that maintain all piston strains in exactly the same line with the connecting rod, a uniform flywheel and counterweighted running gears.

These compressors embody the simple light-weight feather-type valves which characterize Worthington compressors and for which important advantages are claimed. Suction and discharge valves, located in the cylinder body permit the full area of the cylinder head to form a water jacket, which cools the air and valves, in addition to keeping the valves free of carbon. Low power consumption is claimed because of the Admirality metal tube inter-coolers.

Early cut-off, provided by double-piston steam valves with adjustable riding cut-off valves, results in high steam expansion. The point of cut-off can be controlled either manually or by a governor. The automatic cut-off governor that is provided may be arranged as a speed-and-pressure or variable-speed type.

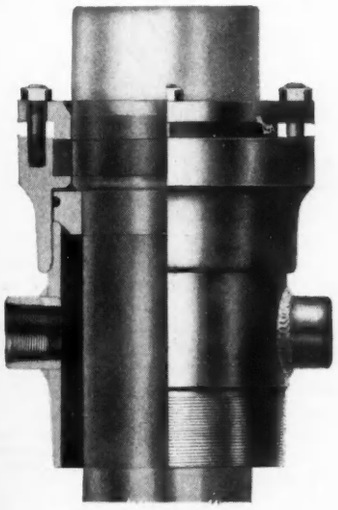
All bearing surfaces are force-feed lubricated and low oil operating temperatures are assured by a lubricating oil cooler in the line. Duplicate pumping equipment is provided so that each side of the compressor is lubricated independently of the other.

CASING HEAD

Rector Well Equipment Company

Rector Well Equipment Company, Fort Worth, Texas, has placed on the market a new casing head which has been designated as Type "C." Built for 1,000-pound test pressure, it is designed for use on comparatively low-pressure wells of shallow and medium depths. Construction features include a drawn-steel body and semi-steel cap.

It has substantially all of the features of the higher pressure line of Rector casing heads except for the double collar (recessed coupling). It has a full opening body and the same repackable-under-pressure advantages, and offers the vertical loading feature. It has the split ring feature to support the pipe under an ordinary casing collar.

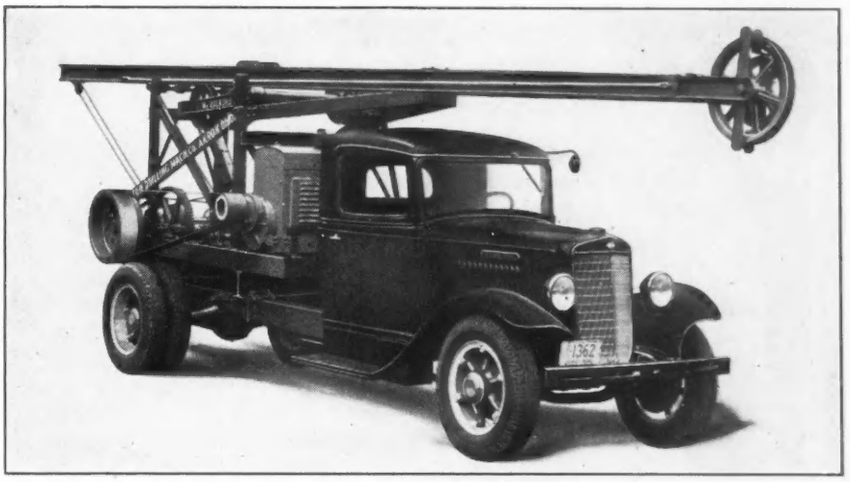


Rector Casing Head

DRILLING MACHINE

Star Drilling Machine Company

Star Drilling Machine Company, Akron, Ohio, announces No. 240 Speed Star drilling machine for shallow water wells, sounding holes, formation testing and test holes for geophysical operations.



Star Drilling Machine

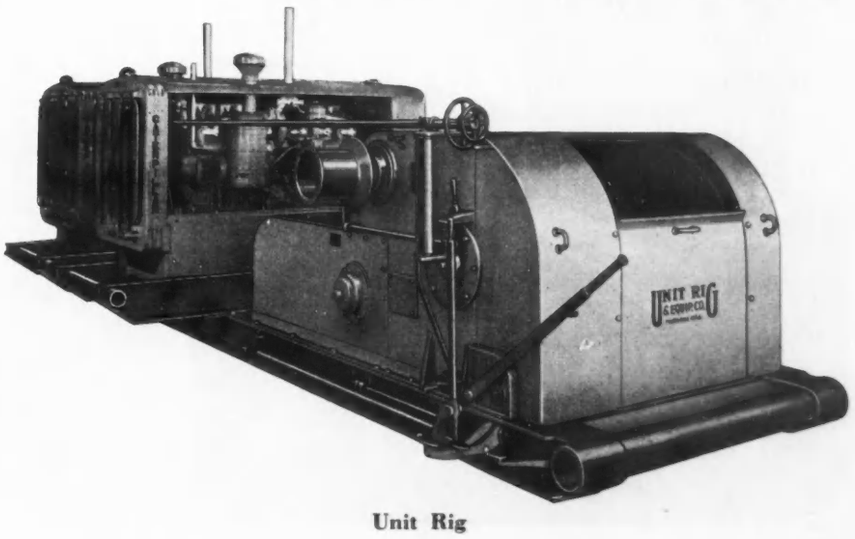
This machine is of all-steel, rugged construction, mounts on a 1½-ton truck and is also available in trailer models with either steel or pneumatic tire wheels. It is conservatively rated for 300 feet of 6-inch hole.

PORTABLE DRILLING RIG

Unit Rig & Equipment Company

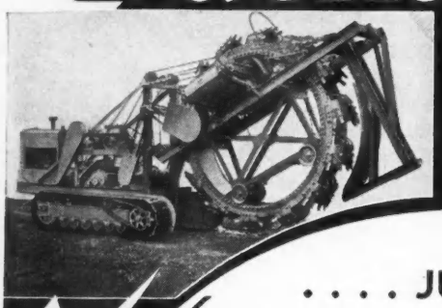
Unit Rig & Equipment Company, Tulsa, Oklahoma, announces a portable, mechanical drilling unit for which unusual economy is claimed in drilling wells of 2000 to 6500 feet. The drawworks and transmission systems are arranged to take 100 to 200 horsepower engines, either Diesel or gasoline, and although engines and drawworks may be separated if desired, the unit is mounted so it may be moved intact.

This unit is described as Model U-10, and embodies, according to the manufacturers, several new and original features in design and construction. The speed control is handled by only one lever which, by a new method of friction clutch application, allows shifting from low to high



Unit Rig

Buckeye



Service Ditcher

. . . . JUST RIGHT

for DITCH 15" to 24" WIDE

MODEL 12

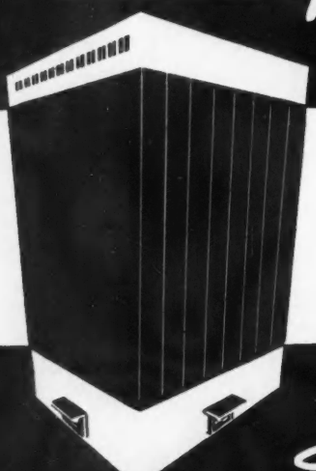
Some ditching looks easy — until you start. Or it may look plenty tough. But whether stony soil, restricted right of way, heavy time penalties in the contract, exactness required, or any of a dozen other difficulties confront you, a Buckeye Model 12 will see the job through on schedule.

It digs trench 15" to 24" wide to 5½' deep, at speeds ranging from 22" to 156" per minute. An additional sprocket gives 28' per minute. No soil short of solid rock can stop it. Complete facts are yours for the asking.

BID THE Buckeye WAY • ask for our operation data before you bid •

THE BUCKEYE TRACTION DITCHER CO.
FINDLAY, OHIO, U. S. A.

That Friendly Atmosphere



Plus FINE FOOD

Rates: $2.00 Up

STOP AT THE Hotel TULSA

and back to low without change in engine speed. Transmission is of chain-drive, oil-bath type, fully enclosed and dustproof. There are four forward and two reverse speeds.

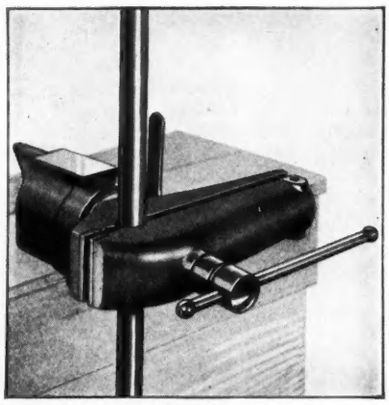
The brakes are fullwrap, self-energizing and equalized. Brake construction insures safety and easy "feeding off." Bands are interchangeable and brakes are instantly adjustable at one point.

Arrangement of the Unit Rig is such that, although normally one engine is connected with the drawworks and the other with the mud pump, the system of clutches permits the engine drives to be compounded to run either or both the drawworks or the mud pump, both engines handling the common load.

PORTABLE VISE

The Lisle Corporation

The Lisle Corporation, Clarinda, Iowa, has placed on the market a portable vise for oil country use, made in two parts consisting of a base unit and a hinged clamping unit that swivels in the base so that it can be set and clamped



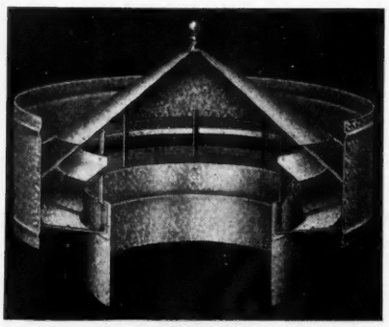
Lile Vise

at any desired angle. There is a slot in the base for a holding bolt and an anvil surface on the top. The vise is made with two pipe jaws and a set of flat jaws, the pipe jaws can hold up to 3-inch and the flat jaws square work up to 6-inch. Provision is made in the base of the clamping unit for the insertion of a pipe or bar to serve as a handle when the unit is used separately as a wrench or a clamp.

GRAVITY VENTILATOR

Burt Manufacturing Company

Burt Manufacturing Company, Akron, Ohio, has announced a roof ventilator designed as a moderately priced unit of good air moving ability which is adaptable to all ordinary ventilating problems. Design features include protected free outlet area well in excess of airshaft area, as-



Burt Ventilator

suring unrestricted passage of air through the ventilator head; inverted lower louvre which efficiently directs upward flowing air currents through the ventilator head, thereby increasing its siphonage action and preventing backdrafts; generous overhang of ventilator top assures storm proofness; windband is amply proportioned to assure a large suction area and consequent air moving capacities, and internal bracing is more than sufficient to render the unit rigid under any possible condition of wind or snow loading.

The ventilator is designed to receive either the sliding sleeves, sliding cone, butterfly or louvre damper. It is constructed in all materials.

1937 AIRPLANES

The Waco Air Craft Company

Waco Aircraft Company, Troy, Ohio, has announced the 1937 line of Waco cabin airplanes, featuring definite refinements in design and finish.

Outstanding among the new features of the C-7 is the landing gear with full 9-foot tread and 8½ inches of oleo travel, giving much smoother landings, and increased safety when cross-wind take-offs are necessary. This improvement, together with larger split trailing edge flaps and toe-operated hydraulic brakes, makes the Waco an even better airplane for the operator who finds it necessary to land and take off in restricted areas immediately adjacent to the operations in which he is interested.

New Model Waco Airplane

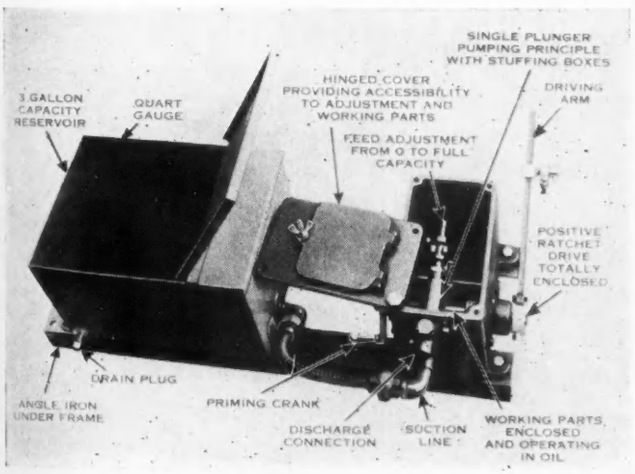
The interior of the C-7 cabin has undergone several changes for the better. The front seat area is 2 inches wider, and the back seat 5½ inches wider. Seats, walls and ceiling are covered with French grey broadcloth, beaded and trimmed with red leatherette. All interior lines have been rounded for the same smart, streamlined effect found in modern transport planes.

NEW FIELD TREATING PUMP

Hills-McCanna Company

Hills-McCanna Company, Chicago, announces development of a new proportioning pump for feeding treating agents into crude oil in the flow line from the well. This pump is designed to deliver light or heavy chemical treating agents, regardless of seasonable temperature fluctuations.

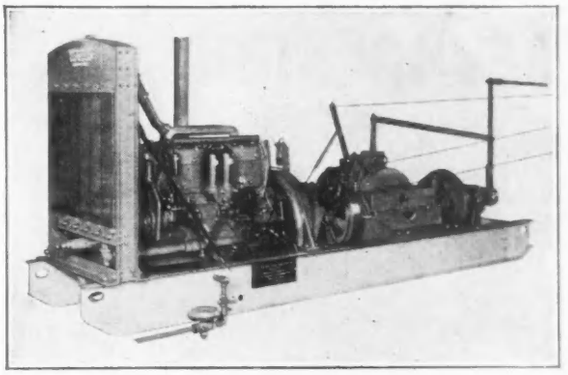
This pump is provided with an enlarged suction, and special valve design and it is said that it will function dependably, continuously, and uninterruptedly, on a short stroke, and with heavy chemicals and will give the same uniform results by maintaining dosage.


SINGLE PLUNGER PUMPING PRINCIPLE WITH STUFFING BOXES
3 GALLON CAPACITY RESERVOIR
QUART GAUGE
HINGED COVER PROVIDING ACCESSIBILITY TO ADJUSTMENT AND WORKING PARTS
DRIVING ARM
FEED ADJUSTMENT FROM 0 TO FULL CAPACITY
POSITIVE RATCHET DRIVE TOTALLY ENCLOSED
DRAIN PLUG
ANGLE IRON UNDER FRAME
PRIMING CRANK
DISCHARGE CONNECTION
SUCTION LINE
WORKING PARTS ENCLOSED AND OPERATING IN OIL

Hills-McCanna Chemical Pump

Accurate delivery can be depended upon because of special check valve construction. Minute quantities, assuring economical performance, can be delivered. All working parts are completely covered and operate in a bath of oil to assure long life and low maintenance.

A special structural steel base to give easy handling is another feature of its "unitized" construction. The assembly is so designed that a driving arrangement to fit any operating condition in the field can be incorporated.



YOUNG ENGINES
Stay on the Job

● You don't need to pamper a Young Drilling Engine. Put it on your toughest job. It will reach "Pay sand" faster, at less cost per foot, and still be in good condition to tackle the next job.

● Young Engines are rugged! They are built by men who have had years of experience in the oil country—men who know the terrific punishment drilling engines must take. Try a Young Engine on your next job. Write for New Bulletin 20-W. Young Engine Corporation, Canton, Ohio. Mid-Continent Representative, A. E. Avers, 1323 South Ellwood Ave., Tulsa, Oklahoma.

YOUNG DRILLING ENGINES
GAS . . . GASOLINE . . . DIESEL

AN OUTSTANDING HOTEL YOU CAN CONFIDENTLY RECOMMEND

Hotel

KANSAS CITIAN

KANSAS CITY, MO.

Ideally located downtown, yet a block from noisy street car lines. Every room with bath. Attractive suites. Rates, single from $2.50 . . . double from $4.00.

MANY EXCLUSIVE FEATURES

1. All Guest Rooms above the 10th Floor, assuring quiet and also cool temperatures in summer months.
2. Beautiful Tile Swimming Pool open both winter and summer.
3. Turkish Baths with graduate Swedish Masseurs experienced in working with the Medical Profession.
4. Popular Price Dining Room. Also Spanish Cocktail Room.
5. Within a stone's throw of new Municipal Auditorium.

BALTIMORE AT ELEVENTH

IN THE CENTER OF THE DOWNTOWN BUSINESS DISTRICT

SIDETRACKING
MADE EASY!

The Kinzbach Sectional Whipstock and Milling Tool have inherent features of design and construction that make it possible to:

1. Mill out at any desired point in the casing, in any direction, without using an anchor other than that built into the unit.

2. Secure a good, clean window of sufficient length to eliminate difficulty in subsequent drilling operations.

3. Mill out without fear or danger of the whipstock shifting in the hole.

4. Mill out between couplings, eliminating all danger of parting the string.

5. Mill out of any grade, weight, or size of casing.

Our years of experience place us in a position to offer considerable assistance on a job of this nature. We maintain a complete stock of both Whipstocks and Milling tools for your convenience.

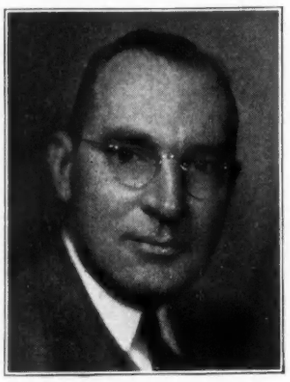
KINZBACH
TOOL CO., INC.
HOUSTON, TEXAS

California Representative:
ALEXANDER ANDERSON, INC.

This Week with the Industry's EQUIPMENT SUPPLIERS

Pape Heads Valve and Fittings Department of Crane Company

W. Howard Pape recently has been named manager of the valve and fittings department of Crane Company, Chicago. In this position he heads a new department of the company which will have charge of all activities concerned with estimating, engineering and sales of valves, fittings, pipe and fabricated piping.



W. HOWARD PAPE
Manager of Valve and Fittings Department, Crane Company

Pape enters his new position with 25 years of experience in a wide range of industrial work. His first activity was in railroad construction, followed by similar work on the New York subways. In 1914 he entered the oil industry, serving subsequently as designer, operator and sales engineer. He joined Crane Company in 1927 as special representative in New York and later at Boston. For 6 years he was in the Oklahoma and Gulf Coast oil fields, and for the past year and a half has been manager of the oil sales department in the general office at Chicago.

Hughes Tool Wins Drilling Cone Reconstruction Suit

In a suit filed by Hughes Tool Company against Southwestern Tool Company and Emil Dufek, Judge Vaught of the United States District Court at Oklahoma City, held in favor of the plaintiff, Hughes Tool Company, in a recent decision.

The suit involved the alleged repair by the defendants of cones manufactured by the plaintiff. The court ruled that the operations of the defendants upon worn out Hughes Tool Company cones was not legitimate repair, but was rebuilding and reconstruction, and hence an infringement.

The court stated:

"The defendants made, in the sense of reconstructed, cones embodying all the elements of the claims of the patents in suit as enumerated. * * * The plaintiff is entitled to an accounting prayed for in plaintiff's bill of complaint, together with the costs of this suit."

This decision settles the disputed question of whether or not reworking and retipping of worn cones is an infringement of Hughes Tool Company's patents or simply legitimate repair. The court held it to be an infringement.

C. W. Gilmer Transferred to New York by U. S. Rubber Products

The Mechanical Goods Division of United States Rubber Products, Inc., has announced that C. W. Gilmer, manager mechanical sales, Seattle, Washington, branch, has been transferred to the New York office, 1790 Broadway, as belting sales engineer, operating under T. A. Bennet, manager belting sales.

L. F. Koepp, formerly salesman in the Seattle district, has been appointed to take Gilmer's place in the Seattle branch.

Moorlane Company Tulsa Distributor for Lycoming Engines

Moorlane Company, 409 Archer Street, Tulsa, has been appointed distributor for Lycoming natural gas engines and Lycoming natural gas engine generating units for the Tulsa territory, according to an announcement by Lycoming Manufacturing Company.

Bruce E. Gold is Atlas Supply Company Sales Engineer

Bruce E. Gold, formerly with the Caterpillar Tractor Company, has been appointed sales engineer for Atlas Supply Company, with headquarters at Tulsa. He brings a wide experience in engine design, power mechanism and oil country operations, having been assistant chief engineer for Weber Engine Company, Kansas City, prior to his connection with Caterpillar Tractor Company.

BRUCE E. GOLD
Sales Engineer Atlas Supply Company

McFarland Heads Sales of Lycoming Gas Engines

E. D. Herrick, president of Lycoming Manufacturing Company, Williamsport, Pa., has announced appointment of J. T. McFarland as sales manager of the natural gas engine division of the company.

McFarland has been associated with Worthington Pump & Machinery Corporation in various capacities for the past 18 years. He will be in charge of sales of gas-engine generating units and gas engines for general power purposes, with headquarters at Williamsport. These units and engines were introduced recently.

Star Drilling Machine Warehouse to Abilene, Texas

Star Drilling Machine Company's Wichita Falls warehouse has been transferred to 509 S. 11th, Abilene, Texas. Henry Brooks is manager of the new warehouse, where a complete stock of parts is available.

Hills-McCanna Company Has New Warehouse at Houston

Hills-McCanna Company, Chicago, Illinois, announces the moving of its Southwestern headquarters to 47 San Jacinto Street, Houston. At this location it will maintain its Southwestern office and warehouse, with a complete stock of force feed lubricators and parts, chemical proportioning pumps for oil field service, as well as other products.

Dresser Couplings Used on New Oil Line

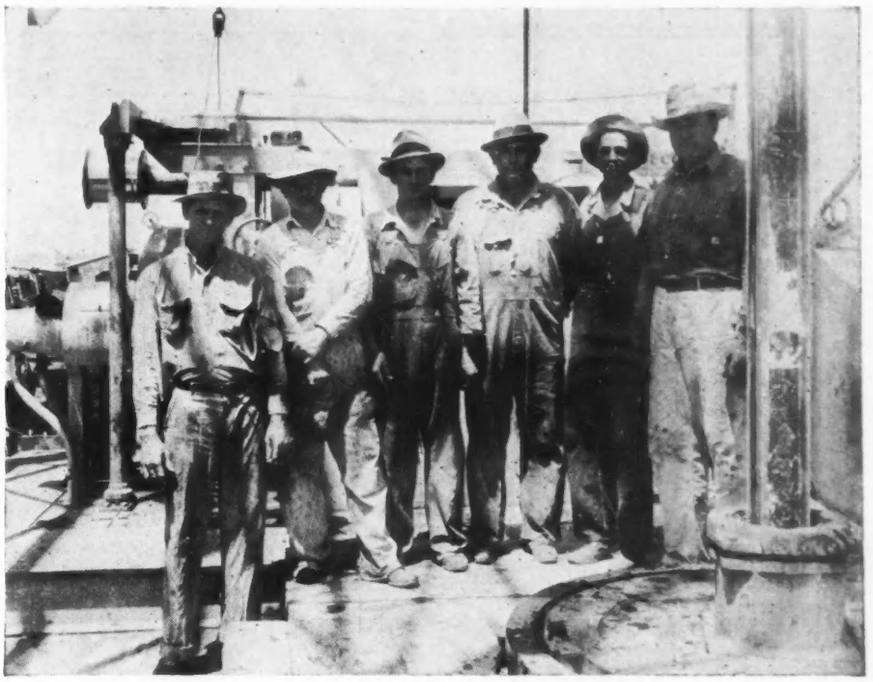
The S. R. Dresser Manufacturing Company announces that on the new double oil line being layed by McClanahan Pipe Line Company of Mt. Pleasant, Michigan, they are using 2260 Dresser Style 38 couplings for light wall steel pipe and that every joint will be Dresser coupled. Construction of the line, to be used in the transportation of crude oil from gathering lines to a larger main line, is being carried forward rapidly by Sylvester Rich, Bradford pipe-line contractor.

Oil City Brass Works Still Working After Fire

Fire which inflicted considerable damage to the plant of Oil City Brass Works in Beaumont week before last, did not incapacitate a single machine or any department of the plant. The blaze which consumed the pattern storage and swept the machine shop occurred on Saturday night and the entire plant was in operation at starting time Monday morning, according to Geo. E. Bryant, president. "Rumors that any departments of the plant were incapacitated by the fire are without foundation," says Bryant. "Our foundry and forge departments were untouched by the blaze; our pattern and machine departments were in full operation the Monday morning following the fire. We are giving our customers normal service. Meantime, restoration of the damaged portion of the building has begun."

Ideco "Big Giant" Draw Works Shows Speed

A record performance was made recently in the Evangeline field by an Ideco "Big Giant" draw works owned and operated by W. T. Burton Drilling Company of Sulphur, Louisiana. The crew headed by E. R. Scales, driller, "broke out" and "set back" 37 thribbles (92 feet) of 4½-inch OD drill stem in 29 minutes, using 8 active lines. This is an average of one thribble every 47 seconds, and is claimed to be an all-time record.



Left to right: A. Duhon, B. Leblanc, Joe Halloway, E. R. Scales (driller), S. T. D. Kimball and G. Ledger, the crew that made a record running pipe for W. T. Burton Drilling Company.

The spooling drum on this draw works is claimed to have the largest diameter of any on the market. Its size is one of the features of superiority claimed by the manufacturer; it saves line; the line spools more evenly; it gives high line speeds without racing the engine.

Construction and design of the "Big Giant" includes double cut-tooth sprockets for the drum drives and engine drive, enclosed "pressure-spray" oiling system which provides perfect lubrication for the chain in sealed housings, water-cooled brake rims, self-energizing compound equalizing brakes with micro-sensitive feed-off characteristics and patented adjuster, alloy steel shafts, and a rugged steel frame.

Additional Ideco equipment on the Burton rig includes a 27-inch bobtail make-and-break rotary, "Super Duty" crown and traveling blocks, line reel, derrick and substructure.

Oil Company STOCK FORMS
FOR ACCOUNTING AND FIELD REPORTS

Stock Forms For
- ACCOUNTING
- PAY ROLL
- MATERIAL
- DRILLING
- PRODUCTION
- GEOLOGICAL
- TRAFFIC
- OFFICE

The GULF PUBLISHING COMPANY operates a department for the design and production of forms for oil company use, and carries in stock ready for immediate delivery over 100 forms.

We have published a completely illustrated catalog of these forms. At your request we will send yeu a copy of this catalog.

GULF PUBLISHING COMPANY, 3301 Buffalo Drive, Houston, Texas

Complete stock of these forms are available in:
CORPUS CHRISTI from Jack Bonner Company
SAN ANTONIO from Alling Blue Print Company

Squeaks from the Bull Wheel

Oil Right!

Chuck Rice up in Pittsburgh has solved the lubrication problem on his lawnmower. Chuck, it appears, had difficulty in remembering when to oil. The solution was to cut the top off a front page of The Oil Weekly, and paste it on his lawnmower. Now he has no difficulty in remembering to "oil weekly."

Never Despair

A charitable woman, much interested in a poor neighborhood, noticed that whenever she called on a protege of hers, she always saw a very down-and-out sort of man standing at the corner of the street.

One morning she took compassion on him, pressed a dollar into his hand and whispered, "Never despair."

Next time she saw him he stopped her and handed her nine dollars.

"What does this mean?" she asked.

"It means, M'm," said the man, "that 'Never Despair' won at 8 to 1."

Immune!

"Don't you want your office furnishings insured against theft?"

"Yes, all except the clock. Everybody watches that."

The Score

"By the way," she said, when a piece came to an end, "what's that book the conductor keeps looking at?"

"That's the score of the overture," he replied.

"Oh," she exclaimed, "who's winning?"

Pop Knows

For weeks the Sunday School teacher had sought to impress upon her pupils the fact that God is everywhere about us. For a test question she asked: "Willie, where do you think God is this morning?"

"In our bathroom at home," was Willie's prompt and assured reply.

"What on earth makes you say that?" asked the amazed teacher.

"'Cause," Willie's eyes shone triumphantly, "just before I left I heard Papa say: 'My Lord! How long are you going to be in there?'"

Strategy

The meek little man came up to the policeman on the street corner.

"Excuse me," he said, "but I've been waiting here for my wife for over half an hour. Would you be kind enough to order me to move on?"

Educated

"What did your son learn at college?"

"Well, he hadn't been home three days before he showed me how to open a bottle with a half dollar."

Supply and Demand

"When I was here last, there were two windmills. What has become of the other one?"

"We had to take it down."

"Why?"

"There was only wind enough for one."

Locale

Asked for a paraphrase of the sentence, "He was in high dudgeon," a city pupil wrote:

"His cell was on the top floor."

Motoring Hint

And then there was the sweet young thing, taking the examination for a driver's license, who was asked: "If your brakes suddenly failed to work while you were going down hill, what would you do?"

She hesitated only a moment, then smiled brightly and answered: "Why, that's easy; I'd just jump out and put a big stone under the wheel."

Carried Out Orders

Several new members of a harriers' and athletic club turned up for the initial handicap. The captain told them that in the event of their going astray they must not lose heart, but endeavor to pick up the trail.

At the end of the race, and while the harriers were awaiting the result of the handicap, they were amazed to see the last novice come staggering in with his arms full of dirty-looking paper.

"What's that?" asked the captain.

"The trail I've picked up," was the reply.

Clear

Chinese patient (on the telephone): "Doctor, what time you fixee teeth for me?"

"Two-thirty—all right?"

"Yes, tooth hurtee, all right; but what time you fixee?"

Explained

Passenger: "I don't sleep a wink, the way this train jerks. Is the engineer crazy?"

Porter: "No, boss, he's jest teachin' his wife how to drive!"

Choose Weapons

Customer (having a rough shave): "I say, barber, have you got another razor?"

"Yes, why?"

"I want to defend myself!"

Rock and Roll

A man was fumbling at his keyhole in the small hours of the morning. A policeman saw the difficulty and came to the rescue.

"Can I help you to find the keyhole, sir?" he asked.

"Thash all right, old man," said the other cheerily, "you jusht hol' the housh shtill and I can manage."

Shades of Lincoln

Augusta, Ga., April 1.—(A.P.)—Charley Yates, Atlanta golfer, wowed the clubhouse gang at the Augusta national golf tournament Thursday with a monkey story.

It seems a Florida orange grower, troubled with strikers, had stumbled on a monkey which could pick 100 crates of oranges a day. The orange growers decided to band together and buy 100,000 monkeys as orange pickers. A grower from Georgia voted against it.

"Give us one real reason," pleaded the orange grower.

"Well," drawled the Georgian, "if we get those monkeys and they're any good, the dam yankees will set 'em free."

JENSEN JACKS
(see opposite page)
Distributed throughout the Mid-Continent and Gulf Coast by
BRIDGEPORT
For Quick, Convenient and Economical Jensen Jack Service, Telephone the nearest Bridgeport Representative—station to station—at any time, from any where.
THE BRIDGEPORT MACHINE COMPANY
HOUSTON . DALLAS . SAN ANTONIO . CORPUS CHRISTI . ODESSA
SHREVEPORT . TULSA . OKLAHOMA CITY . WICHITA . and Branch Stores